FIELD CROP ABSTRACTS

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CORRIGENDA

Abs. 129	line 18	:	for seed from read seed of
Abs. 397	line 11	:	for *Helminosporium* read *Helminthosporium*
Abs. 608	in title	:	for André, M. E. read André, E.
Abs. 609	line 1	:	for or read on.
Abst. ,,	line 4	:	for 2, 3, 4 read 2, 3, 5
Abs. ,,	before—D.B.	:	insert [See also *Herb. Abstr.* 20, Abs. 855]
Abs. 803	in title	:	for Rubur read Robur
Abs. 868	line 3	:	for *Thiellaviopsis* read *Thielaviopsis*
Abs. 930	in title	:	for G.R. read R.G.
Abs. 936	line 25	:	for *D. anomalum* read *G. anomalum*
Abs. 982	line 3	:	for *acontifolius* read *aconitifolius*
Abs. 1474	in title	:	insert Jr. after C.R.

FIELD CROP HUSBANDRY

TECHNIQUE

1 WAGENINGEN, Instituut voor Landbouwkundig Onderzoek. Handleiding voor veldproeven. [**Manual of experimental technique.**] 3rd edn. *Med.LandbVoorlDnst* 1949. No. **59.** pp. 139. 16 pls. Table.

The present booklet is a revised, considerably enlarged edition of one published first in 1934 and again in 1941. It covers experimental technique not only in connexion with field trials, but also in sampling and analysing grassland and in studying chemical composition. Findings are based on the constantly tested and improved methods used by the Netherlands Experiment Stations and especially by the Central Institute for Agricultural Research. The principal chapters deal with the planning of field trials; arrangements for recording and management; measuring; manurial treatment; the marking out of rows for sowing or planting; sowing and planting and choice of method; control of disease; recording practice; implements and machinery (several special implements are illustrated by photographs); harvesting; the sampling of grassland for botanical analysis; submission of samples, in which a table shows exactly how samples of different plants and soil should be taken, packed, and despatched, and what authority is responsible for dealing with various types of material; and chemical analysis and sampling for this purpose. The final chapter contains lists of abbreviations and symbols employed, a list of implements and necessary tools, and other miscellaneous information.—G.M.R.

2 CONAGIN, A. Eficiência na experimentação com canteiros. [**Efficiency in plot experiments.**] *Rev. Agric. Piracicaba* 1949. **24.** 123-8. [English summary 126-7.]. [Exp. Division, Inst. Agron., Estado S. Paulo, Brazil]

The efficiency of experimental designs was studied with data from a uniformity trial of wheat at Campinas in 1947. Twenty small areas, subdivided into twenty-five plots of 5.60 m. × 1.20 m. were obtained by randomization and twenty different designs of the types to be considered were superimposed on them. The following designs were compared: (a) arrangement of five varieties with five replications completely at random; (b) arrangement of five varieties in five square blocks; (c) the same as (b), but eliminating the gradient within blocks by the covariance between position of the plot in the block/yield of plot; (d) arrangement of five varieties in five long blocks; (e) the same as (d) but eliminating gradient within blocks; (f) Latin square 5 × 5. The significant difference between means expressed as percentage of the general mean was used to evaluate efficiency. The values obtained are tabulated. Taking 100 per cent as the value of the best design, the mean values are, in percentage: (a) 70.9; (b) 87.6; (c) 94.8; (d) 71.3; (e) 93.4; (f) 100.—From author's summary.

3 ENGELBEEN, M. L'appoint des biomathématiques aux problèmes agronomiques. [**Biomathematics applied to agronomic problems.**] *Bull. agric. Congo belge* 1949. **40.** 787-91.

With the aid of practical examples the author explains how biometrical control is useful in helping to solve agronomical problems, but stresses the need of a perfect knowledge of the method and of a right interpretation of the results. He believes it advisable that only one agronomist should carry out the statistical control of all the trials in a research station.—E.B.

LAND UTILIZATION AND MANAGEMENT

4 RUSSELL, Sir John. **World population and world food supplies.** *Nature, Lond.* 1949. **164.** 379-87.

The article comprises the Presidential Address delivered to the British Association at the meeting in Newcastle-upon-Tyne, Aug.-Sept, 1949. The subject was discussed from the following aspects: extension of food-producing areas; soil erosion; intensification of cropping; and new uses of science in food production.—M.H.

5 LOMMEZ, J. Studiën over het kleine landbouwbedrijf. I. De grondverbrokkeling. 266 bedrijven. [**Studies of small holdings. I. Parcellement in 266 farms.**] *Med. LandbHogesch. Gent* 1949. **14.** 9-89. Charts. [French and English summaries, 85-8.] [Govt. Sta. Agric. Econ., Ghent, Belgium]

The farms studied were all situated in the Flemish provinces of Belgium, 156 in the sand loam region, sixty-six in the sand region, and forty-one in the polders. Data are presented on the *parcellement* of the farms; on the distribution of the separate plots; the arrangement of the plots, with special reference to roads; and nature of ownership or tenancy. The average farm numbered thirteen plots, smaller farms having relatively more strip-farming than the larger. The average size of a plot was 1.1702 hectare; this area increased with the area of the farm. Nearly 28 per cent of the plots were less than 0.5 ha. and nearly 59 per cent were less than 1 ha. Grazed plots were larger than hay leys. The average distance from farm to fields was 673 metres; in many cases (28 per cent in the sand-loam region) the distance exceeded 1 km. Private roads, with an average length of 683 m., were found on 76 per cent of the farms studied; they involve a considerable waste of land, especially on the small farms and in the sand region. The *parcellement* or division into many separate and sometimes widely spaced plots, as revealed in this study, must be detrimental to economic farm management.—G.M.R.

6 FRANKE, A. and VISSER, C. **Crops grown on Walcheren again.** *World Crops* 1949. **1.** 37-41.

In October 1944, when the dykes were breached by military operations, 80 per cent of the cultivated lands of Walcheren was inundated. For a year the island was covered by tidal waters; the chemical action of the salt water and the movement of it physically damaged the soil; drainage channels were silted up, fertile topsoil removed and sea sand deposited over large areas. By early 1946, the dykes had been repaired, the island was dry and rehabilitation commenced. A complete soil survey of the island followed; this was essential for the planned reparcelling of land which is now taking place, doing away with the many former fragmented holdings. Experimental fields were established to find out which crops could be successfully grown at different salt concentration. On the results obtained, farmers were advised accordingly. Drainage went on apace in order to restore rapidly the structure of the soil and the Government purchased large quantities of gypsum for this purpose. The rapid restoration of the land for production has thus helped in restoration of the former cattle stocks on the island. Grassland required no gypsum, but chalk marl was applied to rectify lime deficiencies and by the spring of 1949, total restoration of the pastures was assured. [See also *Herb. Abstr.* 18, Abs. Nos. 11, 419 and 827.] —P.M.

7 POMPEI, M. L'unità colturale. [**Cultural unity.**] *Ital. agric.* 1949. **86.** 525-7.

The author discusses, on the basis of facts presented, the situation determined by the extreme division of the land which is taking place in many Italian regions and stresses the need for a remedy. —E.B.

8 BERTÈ, M. Notizie sul comprensorio del Canale Villoresi. [**Information on the area of the Villoresi Canal.**] *Ann. Sper. agr.* 1949. **3.** n.s. Special number. 127-220. [English summary 180.] [Irrigated Experimental Field of Marcallo]

The first part of the article gives general information on this area of 58,000 ha., which has a continental climate being situated at the north of Milan, between the Ticino and Adda rivers. In the past the principal cultivations were cereals, vine and mulberry-tree. With the introduction of irrigation, which started about 60 years ago, and consequent extension of forage crops, a dairy industry has developed. Cultural and irrigation methods are described, the principal rotation followed in the region being: maize for grain/wheat with clover/clover 3 years; of these crops maize and clover are irrigated. The author then reports on the trials carried out for 8 years to study the best use of irrigation water with regard to production, and relative conclusions are given. The thirty-seven tables included give meteorological data for Milan (collected by the Brera Observatory) and for Marcallo, data of water-table levels, and information on the irrigation trials.—E.B.

9 KLING, W. **Collective and State farming in Yugoslavia.** *Foreign Agric.* 1949. **13.** 136-8.

Collective farms in Jugoslavia still account for only a small part of the total crop area, about 19 million acres, though the Government is still encouraging their formation. These collectives are not true co-operative ventures of freely deciding peasants, but the broad lines of policy and local management are directed by the Government. By 1947, 500,000 acres were under State farms, each of which was about 2500 acres, and engaged in seed, grain and fish production, and horse breeding. Under the 5-year plan the total area of State farms is to increase by 49 per cent to 740,000 acres, but probably they will play only a secondary part in production compared with collectives.—S.D.

10 BLACK, A. G. **Iranian agriculture—present and prospective.** *J. Farm Econ.* 1948. **30.** 422-42.

The agricultural economy of Iran still contains elements of the nomadic economy interspersed with a settled agriculture made possible by irrigation. In the north, beans, rice and cotton are among the crops successfully produced. In the north-west there is sufficient precipitation to produce, with the aid of some irrigation projects, large crops of dry-land grains. The great staple products are wheat and barley which are raised throughout the country but most successfully in the irrigated villages, the mountain valleys and north-west Iran. Rice is produced along the Caspian sea, and to a lesser extent in south and central Iran.

Agricultural techniques have changed little during the centuries so that productivity in Iran is low by any measure. This is true for the whole area from North Africa to India which is similar in character. Terrain and climate make inevitable a large and permanent grazing economy with " islands " of intensively cultivated irrigated lands wherever water can be found or developed. Productivity needs to be increased but progress must be gradual. Vocational education of an elementary nature is suggested as a first step, together with the introduction of improved tools and seeds; health programmes to raise the nutritional standards of the peasants should follow. By this means productivity could be raised and fresh markets found to the advantage of general trade relations. —A.D.H.

11 AGRONOMIE TROPICALE. Les petits aménagements d'hydraulique agricoles du Haut-Niger (Guinée). [**Control of small-scale irrigation works in the Upper Niger (Guinea)**] *Agron. trop.* 1949. **4.** 420-3.

The object of the water control described is the improvement of conditions determined by natural floodings, by means of simple works carried out with local materials. These works have been or are in process of being accomplished on a number of plains along the Niger and its tributaries, covering a total area of about 12,000 ha. of which 5000 at the most are at present under rice cultivation. Yields, however, are uncertain because of irregularity in the natural water supply.—E.B.

12 PENDELTON, R. L. **The Belgian Congo: impressions of a changing region.** *Geogr. Rev.* 1949. **39.** 371-400. [Isaiah Bowman School of Geog., John Hopkins Univ., Baltimore]

Changes taking place in the vegetation of the Congo are noted. To the south, north and west of the central equatorial forest are extensive savannahs, burned annually and under which the soil has deteriorated. *Imperata cylindrica* is spreading rapidly over this ever-increasing area and in the tsetse-free areas a few cattle are kept on the poor pasture. The poor quality of the soil makes production of food crops difficult. Compulsory cultivation of food stuffs such as manioc, upland rice, maize, and beans has hastened deforestation. The production of cotton, for export and manufacture, and of *Urena lobata* for cordage, further increased forest destruction.

However, the agricultural scientists of the Institut National pour l'Étude Agronomique du Congo Belge do appreciate the rapid deterioration of soil fertility which is consequent upon the growth of crops such as cotton and grains in the clearings of an equatorial forest. At present, the low value of the crops precludes the use of commercial fertilizers on an extensive scale. Progress has been made in rotations and inter-cropping, the use of cover crops and other " natural " methods of managing the poor soils. *Leucaena glauca*, a rapidly growing leguminous shrub, has been introduced from America, as a partial shade for coffee; in time it may be used as a browse plant.

Compulsory cropping has become a necessity in order to ensure a supply of foodstuffs to the mining and urban areas and government institutions such as hospitals and prisons. The foodstuffs are produced under the supervision of the territorial administration, aided by the local agricultural officers. The produce is paid for at official rates and is usually collected weekly and transported to the consuming centres.—P.M.

13 CHANG CHIH-YI. **Land utilization and settlement possibilities in Sinkiang.** *Geogr. Rev.* 1949. **39.** 57-75.

The province, the northernmost of China, is in effect a vast series of intermountain basins. Density of population per sq. km. of cultivated land is 283, the cultivated area being about only 1 per cent of the total area.

Based upon land utilization and the kinds of crops and times of harvest, the province can be divided into four main grazing regions and five farming regions. Grazing is carried on by the nomadic Kazaks and Malmuks, depending almost entirely on the natural grasses as feed for their herds. *Stipa splendens* is as important in grazing as wheat is in farming. Sheep comprise the main stock and of the total live stock nearly two-thirds are raised by the nomads. In the main, nomadic grazing is confined to the type which has definite encampments for summer and winter grazing.

In Jungaria, the northern basin of the province, 15 per cent of the total cultivated area is under dry farming; the land is usually steep, unsuitable for irrigation. In the Tarim Basin (in the south), land utilization depends upon the availability of water. Irrigation water is supplied by mountain snows, springs and underground water. " An irrigated agriculture means a stable agriculture. Chinese historical records testify that during the past 70 or 80 years no famine has occurred in Sinkiang".

Within the oases, diversified farming is fairly general. Grain production is first and horticulture has some importance. Trade with the Soviet Union has developed and much of the cotton, raisins, apricots and silk is exported to the U.S.S.R. Grain crops, in order of importance, are wheat, corn, rice, kaoliang and barley.

In general, farming methods are primitive. Draft animals (oxen) are used with a plough which consists of a large pole tipped with three or four inches of iron. In some areas, Russian improved ploughs are being used. In the northern basin, the fallow system is widely practised. In the Tarim Basin, night soil is used for fertilizer, the degree of fertilizing decreasing with distance from the towns. Crops are hand-harvested and threshed by driving oxen over the grain on the threshing floor.—P.M.

14 UNITED STATES, Department of Agriculture. Bureau of Agricultural Economics. Misc. Pub. No. 663. **Inventory of major land uses in the United States.** By *L. A. Reuss, H. H. Wooten, F. J. Marschner.* 1948. pp. 89.

Crop production occupies only about 21 per cent of the land area of U.S.A. In 1945, crop land amounted to 403 million acres (including areas of 2 per cent crop failure, and 10 per cent idle or fallow). The present high level of crop production has been achieved by mechanization, the use of lime and other fertilizers and concentration of cropping on the better farms ; the acreage, although fluctuating considerably from year to year, has remained relatively stable for several decades (402 million acres in 1920). Pasture and grazing occupy 1052 million acres or 55 per cent of the land; the ratio of pasture and grazing to crops is 2.6 : 1. Additional acres of woodland, farmstead, etc., bring the total agricultural land to 1756 million acres.

In 1946 crop production per acre was more than 20 per cent above pre-war and production per man was more than 35 per cent. The outlook is for continued high agricultural production. The substitution of tractor for horse power is thought to be nearing the limit and more new crop land is likely to be required, entailing soil conservation and improvement. Future trends are in the direction of better rotations, greater fodder crop production and more seeds hay, reseeding and reversion to grass of exhausted crop land, cleaning some forest areas and developing fertile woodland (the last offset to some extent by greater timberland requirements).—K.J.S.

15 OKLAHOMA Agricultural Experiment Station. Circ. No. C-131. **Irrigation for Oklahoma.** 1948. pp. 28.

This comprises a practical guide for Oklahoma growers contemplating the installation of irrigation equipment. There is tabulated information of percentage increases in yield due to irrigation at one farm (1938-1944) as follows :—lima beans 102 ; snapbeans 238 ; cantaloup 116 ; sweet corn 46 ; cucumber 55 ; egg plant 43 ; mango pepper 238 ; Irish potatoes 73 ; tomatoes 49 ; cabbage 57. At Tipton increases in cotton yields due to irrigation varied from one-fifth to nearly four-fold ; watering doubled the average yield over 9 years.—K.J.S.

16 VICTORIA G., G. Panorama agro-económico de los Santanderes. [**Agricultural economy of the Departments of North and South Santander, a panorama.**] *Agric. trop.* 1949. **5.** No. 2. 31-9. [Div. Econ. Rur., Min. Agric., Colombia]

Rice growing has increased greatly in North Santander within the last 10 years. The crop is irrigated, and the principal varieties grown are Canilla, Fortuna and Palmira. Canilla gives the best yield but tends to lodge and cannot be harvested with a combine. Fortuna and Palmira, although not so productive, are more popular because a combine can be used. New rice fields are opening up along the river Zulia and towards the plains of the Gulf of Maracaibo, where rainfall is somewhat higher and the rice is grown under the dry farming system, for local consumption and for export to Venezuela.

Of the crops grown in South Santander, sisal is among the best grown in the country. Cotton is grown on a small scale only.—G.M.R.

17 ESTRADA, J. A. La economía agrícola del Huila. [**The agricultural economy of the Department of Huila, Colombia.**] *Agric. trop.* 1949. **5.** No. 1. 29-34. [Div. Econ. Rur., Min. Agric., Colombia]

A recently made agricultural census of the Department shows that only 31.5 per cent of its total area is actually in use, and of this little more than 10 per cent is devoted to field crops. Rice, for which the regional soils are favourable, maize and cassava are the most important field products.—G.M.R.

18 BARRAU, J. La classification, la répartition, l'utilisation des terres en Nouvelle-Calédonie. Rapport au VIIe Congrès scientifique du Pacifique. [**Classification, division, and utilization of the land in New Caledonia. Report to the Seventh Pacific Science Congress.**] *Agron. trop.* 1949. **4.** 175-82.

The plant formations which are found in the basins of the island are : (a) a coastal zone ; (b) a grassy savannah with *Melaleuca leucadendron* which extends to 400 or 500 m. above sea level ; (c) forest galleries along the rivers in the savannah zone ; (d) humid forest up to 1000 m. ; (e) dry forest above 1000 m. ; (f) maquis on the summit of the mountains. The agricultural land is divided in holdings which vary in size from less than 25 ha. to 250-5000 ha. The latter holdings are relatively numerous and are devoted principally to livestock rearing (bovines prevailing). The crops grown are ; wheat 150 ha., maize 500 ha., rice 150 ha., beans and peas 100 ha., yam, manioc and taros 1500 ha., potatoes and plantation crops. Stock rearing takes place on the improved grassland (70,000 ha.) and on the uncultivated land, and it is estimated that over 5 ha. are required per animal. Insufficient man power is the principal cause of the limited extension of cultivation (about 11,150 ha.).
—E.B.

FARMING SYSTEMS

19 DEMPSTER, D. G. **Farming in the north-east of Scotland.** *Brit. agric. J.* 1948. **1.** 43-8.

The area includes the counties of Aberdeen, Banff and Kincardine, and contains about one-fifth of the arable land of Scotland. Climate is humid, rainfall ranging from 25 in. on the coast to 60 in. in the south-west; the season, May to September, is mild, with frosts occurring in January and February.

Farms are generally small, 70 per cent being under 100 acres arable. Type of farming varies from milk production near the consuming centres to live-stock breeding on remote upland farms. Between these two there is the largest group, the emphasis being on cash crops and feeding and rearing live stock. Cattle are kept indoors in winter, their keep consisting of turnips, straw and hay: sheep remain outdoors all the year. On the higher land are kept the Scottish Blackface with some Cheviots on the better grazings. Ewe lambs kept for breeding are sent to winter on the lower farms in early October. Poultry and pigs also figure in the farm economy. With the extensive keeping of live stock, grassland is thus very important.

The most important cash crop is oats; Aberdeenshire alone has nearly one-quarter of the Scottish oat acreage. Next in order of importance are barley, seed potatoes, wheat and sugar beet.—P.M.

20 MERCER, W. B. **Farming in the West Midlands.** *J. R. agric. Soc.* 1949. **109.** 83-97. [N.A.A.S. Tettenhall, Staffs.]

The geology, topography and farming systems are briefly described for the separate regions of the Borderland (including West Salop and Hereford) East Salop, the Dairying Area, the Black Country and Worcester. The diversity of the regions and the unifying effect of wartime farming are discussed. Broadly speaking, the Midland milk belt embracing half Notts and Derby, the whole of Stafford and Cheshire, ends in the northern part of Salop, abutting on a tract of barley and feeding land where beet-growing has become a major industry. Worcester, a region of small-scale dairying and mixed farming, lies to the south. To the West there are the great sheep and cattle breeding grounds of the Borderland (and of Wales) where live-stock markets are amongst the largest in Britain.—K.J.S.

21 GOGH, F. van Ontwerp van de mechanische uitrusting van twee landbouwbedrijven van 1000 ha. **Mechanical equipment required for two farms of 1000 hectares each.** *Landbouw, Buitenzorg* 1949. **21.** 1-32. 3 charts. [English summary, 32.] [Agric. Extension Serv., Indonesia]

The two-year cropping system consists of unirrigated rice followed by soybeans in the first year and of groundnuts followed by soybeans in the second year, so that there are three consecutive leguminous crops between each two grain crops. On one farm there is a rainy season of 7 months, on the other of 5 to 6 months. Cultivation from tillage to harvest is entirely mechanical. Equipment planned allows for the clearing of young secondary forest. Transport and processing equipment is also discussed but not included in the calculations.—From author's summary.

22 FOSTER, A. and AITKEN, R. **Recent geographical research in Aragon.** *Geogr. Rev.* 1949. **39.** 472-80.

Scanty rainfall and temperatures showing continental characteristics are typical of the climate of this region. Agriculture is the chief means of livelihood and may be classified as dry farming, intensive agriculture on irrigated land and stock raising. About one quarter of the region is occupied by dry farming, usually on the arable interstream tracts. Under this system, wheat, barley, oats and some rye are grown; wheat occupies some two-thirds of the cereal acreage and normally there is a surplus for export to other regions of Spain. Due to the scanty rainfall nearly one-half of this cereal land lies fallow each year.

The irrigated land falls into two types (a) that having irrigation water available all the year, and (b) land having available water sufficient only for winter irrigation of dry farming crops. Additions to irrigation facilities have been made from time to time; the oldest of the larger works, constructed in the 16th century, irrigates some 57,000 acres. In the modern era, storage reservoirs have done much to improve the systems and in places have made it possible to provide year-round irrigation to land formerly provided with winter irrigation only.

Under (a), land is devoted to special crops such as sugar beet, lucerne, among other types. Aragon produces nearly one-third of the Spanish crop of sugar beet and contains one-fifth of the national lucerne acreage. The entire crop of lucerne is cured for hay and used for winter feeding of cattle. In other parts of Spain it is fed without curing.

Stock-raising is associated with both dry farming and extensive irrigation farming and sheep provide a means of utilizing land unsuitable for cultivation. In the highlands on the northern and southern margins live-stock raising forms the principal means of livelihood. Sheep are the chief source of income and transhumance is practised. Flocks are in the home locality for the spring and autumn only. At this time they spend the nights in fallow rye fields about the small villages (all below 4500 ft. around small cultivable patches of flood plains, glacial terrace or moraines) and at daybreak they graze slopes at slightly higher elevations. In summer, sheep occupy the community-owned high pastures, about 1000 feet above the villages ; in winter they descend to the lowland areas in the interior of the basin. Extension of irrigation systems in the lowlands has given rise to an expansion of intensive land use and this may lead to a decrease in the area available for winter grazing. This in turn would lead to a reduction in the number of sheep in the region.—P.M.

23 PALMER, A. E. **Recent developments of dry farming in Canada.** *Brit. agric. Bull.* 1948. **1.** 165-9. [Dom. Exp. Sta., Lethbridge, Alberta]

The dry farming area includes Manitoba, Saskatchewan, Alberta and much of British Columbia, east of the Coastal Ranges. Rainfall ranges from 22 in. in the eastern slopes of the Rocky foothills to 12 in. on the Alberta-Saskatchewan border. Four systems of farming are distinguished : (1) grain farming (mainly wheat) in the open plains ; (2) grain farming with some forage production and live stock in the drier areas ; (3) mixed farming in the better rainfall areas of the north ; (4) cattle raising, with little or no grain in the dry prairies and lighter soils.

Farming systems and rotations are designed to combat soil erosion. Where wheat is the predominant crop, a system of summer fallow is followed in order to conserve moisture : in these regions the mould-board plough has been virtually abandoned and instead sub-surface tillage is practised, leaving the crop residues on the surface as a protection. Strip cropping is carried out, especially in southern Alberta and in the better rainfall areas there has been a decrease in summer fallow and an increasing use of grass and legumes in the rotation ; those areas considered unsuitable for cultivation are also being seeded to grass. In the driest areas, farmers combine live stock and grain, some of the tilled land being sown to crested wheatgrass for several years. In south-western Alberta, where moisture conditions are favourable, oats are sown in the summer fallow ; they form an autumn feed, being grazed and then the residues are left for protection of the soil.—P.M.

CONSERVATION AND REVEGETATION

24 TEMPANY, H. A. **Soil conservation in the British Colonial Dependencies.** *Brit. agric. Bull.* 1948. **1.** 170-3. [Agric. Adviser, Colonial Office, 1940-6.]

The author has given, in summarized form, a first part of the information contained in his work published as Technical Communication No. 45 of the Commonwealth Bureau of Soil Science.

25 LANTMANNEN SVENSKT LAND. Vinderosion och läplantering under debatt på Skogs-och Betesstämma. [**Wind erosion and shelter belt planting under discussion at the meeting of the Society for Forest and Pasture Preservation of the Province of Malmöhus.**] *Lantm. Svenskt Land* 1949. **33.** 596.

B. Steenstrup, director of the Planting Department of the Danish Society for the Cultivation of Heaths, read a paper on Danish experiences in shelter-belt planting and discussed the possibility of their utilization under Scanian conditions. Lupin has proved particularly responsive to protection from wind and has given greatly increased yields. The planting of shelter belts in Jutland has increased the value of the crop yield by 110 million kroner a year. Hawthorn is recommended as it forms a suitably dense hedge. *Pyrus aria* forms an excellent hedge, but is readily injured through nibbling of draught animals. Coniferous trees are now used to a smaller extent than formerly.—R.P.J.

26 HARROLD, L. L. **Soil loss as determined by watershed measurements.** *Agric. Engng St. Joseph, Mich.* 1949. **30.** 137-40.

The effect of conservation farming on reduction of soil loss has been under observation at the North Appalachian Experimental Watershed, Coshocton, Ohio, since 1941. Records show that soil loss from contour maize land is much less than from sloping rows. Contour ridges will require overtopping before run-off and erosion start. Differences in land treatment are compared, taking into consideration the recognized 4-year crop rotation system (maize, wheat, meadow, meadow).

Contour cultivation and mulch effects are shown by curves, indicating percentage reductions of soil loss. Information to date indicates that the total loss for a 4-year rotation from an 8-acre check watershed amounts to 12.1 tons per acre. Contour cultivation with sod waterways shows reductions up to 75—85 per cent, an average of 66 per cent for the entire year. Mulch treatment shows over 90 per cent reduction in soil loss, and winter mulch has been very effective in erosion control.—M.L.Y.

27 CARREKER, J. R. and BARNETT, A. P. **Runoff and soil loss measurements by cropping periods.** *Agric. Engng St. Joseph, Mich.* 1949. **30.** 173-6.

An evaluation of the protection furnished by cover crops on the cotton plantations at the Southern Piedmont Conservation Experiment Station of the U.S. Department of Agriculture at Watkinsville, Georgia, is based on cropping periods rather than uniform calendar periods. Certain outstanding facts are recorded : soil losses from row-cropped land increase rapidly as the slope of the land becomes more marked; well-built terraces correspond with reduction in loss of soil from the field ; rotation of close growing crops with row crops reduces run-off erosion on sloping land ; dead residues of summer cover crops give more protection to the land against autumn and winter erosion than winter cover crops of oats and vetch ; winter and summer legumes interplanted between continuous row crops give insufficient protection to land on moderately steep slopes. A 3-year rotation of oats-lespedeza, lespedeza and kudzu gives an excellent run-off and erosion control on steep slopes when occasionally turned under for row crops.—M.L.Y.

28 Hickok, R. B. **Runoff losses from permanent pastures and woodlots.** *Agric. Engng St. Joseph, Mich.* 1949. **30.** 80.

Although there is no doubt as to the value of permanent pasture and woodland as protections from soil erosion and seasonal run-off, these will not reduce the total water losses. Data collected during experiments jointly conducted by the Soil Conservation Service, U.S. Dept. Agric., and the Purdue University Agricultural Experiment Station in 1947 show that from six rotation-cropped watersheds (two each in maize, wheat, and soybeans) on moderately well-drained prairie soils, the average run-off was practically 6 per cent of the total rainfall and snow. It was just under 2 per cent from a similar series under a conservation treatment. This compares with slightly over 6 per cent run-off from two well managed permanent pastures.

On slow draining upland as much as 12 per cent loss is reported, and on the woodland watersheds adjacent to the permanent pasture, where there is substantial leaf litter and undergrowth, loss of rainfall is given as 24 per cent.—M.L.Y.

ECONOMICS OF CROP PRODUCTION

29 United Nations, Department of Economic Affairs, Economic Commission for Europe. **Economic survey of Europe in 1948.** 1949. pp. 288.

30 Food and Agriculture Organization. **Report of the F.A.O. Mission for Siam.** Washington. 1948. pp. 132.

At the request of the Siamese Government, the Mission was formed to study economic and technical problems which specifically included: (1) Technical aspects of crop husbandry and especially rice production ; (2) Development and control of water supplies ; (3) Control of rinderpest ; (4) Forest conservation and management ; (5) Improvement in the economic status of the farmer ; (6) Improvement in statistical methods, with special reference to the techniques of crop reporting and co-ordination of statistical work in the field of food and agriculture.

Under (1) it is recommended that rice production can be improved by better water control, application of manures and fertilizers, improvement of varieties, better cultivation and control of diseases and pests. There should be experiments on the use of machinery for rice cultivation, training of skilled technical men, and the setting up of five regional research stations.

Recommendations in respect of (2) include laws to regulate the use of the nation's water resources ; a charge should be made for irrigation services. Further work is needed in recording rainfall and streamflow, and underground water supplies should be investigated.

It is recommended under (5) that the Siamese Government should set up from existing and new units, a co-operative rice marketing organization to purchase and transport paddy, mill it and sell the rice. Attempts should be made to extend the granting of loans to tenant farmers and a plan of capital investment in agriculture should be drawn up.

In regard to (6) recommendations include raising of the status of statistical workers employed in districts and provinces ; appointment of at least one agricultural officer in each province ; nation wide use of standard weights and measures and the early completion of the land survey now in progress.

Some further recommendations for the improvement of the agricultural services are made.—P.M.

31 Cambridge University, Department of Agriculture : Farm Economics Branch. Rep. No. 38. **A survey of the cost of growing linseed in two districts in the eastern counties, 1948.** 1949. pp. 8. [Mimeographed]

Though most of the farms growing linseed were large, the acreage of this crop averaged only 3.3 per cent of the total arable acreage. It was most often sown following permanent or temporary grassland, barley or oats, and seed rates varied between wide limits, but the optimum rate appeared to be between 60 and 70 lb. per acre. Home-grown seed was valued at half the cost of purchased seed. Applications of fertilizers showed no consistency either in type or quantity, and farmyard manure was applied on only four farms. Seeds and manures accounted for 28 per cent of the total costs, and next to labour were the highest item of cost. Harvesting, aggravated by the wet season of

1948, proved the most difficult operation, and was more expensive than for wheat. Inexperience seemed to be the greatest obstacle.

The average total cost was £20 9s. 2d. per acre, and the average yield 9.61 cwt., leaving an average profit of £7 13s. 9d. Costs ranged from £10 to over £28, and yields from 5 to over 15 cwt. per acre. Results also showed a wide variation covering a loss of over £10 per acre to a profit of over £25 per acre. It is evident that more experimental evidence on cultural details will increase the popularity of the crop.—A.D.H.

32 LONDON UNIVERSITY, Wye College, Department of Economics. Farm management survey Rep. No. II. **Financial results for 1947 and for the five years 1943 to 1947.** By *J. A. Chester, J. H. Hooper and J. Wyllie.* **n.d.** pp. 21.

Results obtained in 1947 from a group of general mixed and a group of specialized farms indicated that the proportion of the total expenditure spent on foodstuffs was 8.8 and 3.3 per cent respectively. The expenditure on labour was over 42 and 46 per cent. Comparison between 1946 and 1947 reveals that in both years the proportion of expenditure on purchased foodstuffs was appreciably higher, and on purchased manures lower for the under 100-acre group of farms than for the other groups, and that in both years total expenditure per 100 acres decreases as the size group increases.

On the same two groups of farms revenue from live stock amounted to 16.6 per cent and 5.6 per cent of the total revenue, from crops 38.6 per cent and 22.3 per cent, and from milk 36.7 and 6.3 per cent. As considerable variations occurred, emphasis is clearly laid on the importance of the relationship between revenue and expenditure in considering the net financial results.

Data from seventy farms over a period of 5 years, 1943 to 1947, showed that expenditure on foodstuffs, seeds, manures and rents increased only slightly, the range of expenditure in foodstuffs for this period being between £161 and £172 per 100 acres (adjusted). There was a fairly steady increase in the output from live stock and milk, particularly in 1947, but returns from crop sales showed considerable fluctuations, being lowest in 1946 and highest in 1945 and 1947. Seasonal conditions were the determining factor in this instance.—A.D.H.

33 MANCHESTER UNIVERSITY, Faculty of Economic and Social Studies, Agricultural Economics Department. Bulletin No. 50/FMS 1B. **Farm management survey.** 1949. pp. 32.

On the Upland Dairy Farms the possible advantage of a reduction in stocking which might lead to smaller purchases of expensive bulky fodders and a higher output per head is worth consideration. At present it appears that the economic existence of the small farms depends on the availability of family labour. The practice of purchasing relatively expensive foods to maintain production is also a feature of the Lowland Dairy Farms. Only maximum efficiency in utilization can justify heavy expenditure on non-rationed foods.

Farms in the Arable Group represent the most intensive and remunerative class of farming in the province. Their expenditure per acre on seeds and manures was greater than the total expenditure per acre on the Live-stock Rearing Group. The most important crop was potatoes, closely followed by market garden crops in Lancashire, and sugar beet in Shropshire and Staffordshire. A high value per acre in cash crops depending on the proportion and yield of roots and market garden crops in the tillage area, is most frequently associated with high incomes. Lack of marketing organization and price guarantees coupled with the danger of over-production may discourage further expansion in market garden products.

On the Mixed Arable Farms just over 38 per cent of the total production is derived from crops. The value of the cash crops per acre of tillage is less than for Arable Farms in part due to the greater use of the tillage area for feeding stock.

A slow turn-over leading to a low output per acre is the main problem on the Live-stock Rearing Farms. Milk selling is making some progress. All farms were better off than the previous year. In quite a large degree the arable farming in the province tends to be complementary to the intensive stock farming areas.—A.D.H.

34 LEEDS UNIVERSITY, Department of Agriculture: Economics Section. Fmr's Rep. No. 83. **Some Yorkshire sugar beet costs 1949.** 1949. pp. 20.

The gross cost per acre of growing sugar beet was just over £47 on the light land group and just over £48 on the heavy land group. Cultivations and harvesting were the two greatest costs, and on both groups of farms costs of cultivation slightly exceeded the cost of harvesting. Manures and seeds cost more than cultivations on the light land group, and were not much less than harvesting costs. On the heavy land group they were lower. The rate of seeding was usually from 10 to 12 lb. per acre and was usually sown after corn on most farms. After harvesting, the tops were ploughed in on the majority of the heavy land farms, but on the other group it was more often used to feed cattle and sheep.

Though the average yield on both groups was just over 9.5 tons, there was considerable variation on individual farms which suggests that average costs, without the information on the ranges of yield and cost above and below the average, are of limited value. The average return was just over 5 guineas per acre, but about a third of the farms with yields of less than 8 tons per acre grew sugar beet at a loss or an inadequate profit in 1948. It was evident that there was a close relationship between the yield per acre and cost per ton.—A.D.H.

35 BRISTOL UNIVERSITY, Department of Economics. N/S. No. 52. **Notes on farm economics. Economic and financial results on 196 farms in the Bristol 1 Province. Years 1946-47 and 1947-48.** By *L. J. Hewett.* 1949. pp. 14. [Mimeographed]

There was a small increase in " margins " and " farm profits " over all farms between 1946 and 1947. On the milk production farms returns were lower, but the increased profits on the arable and mixed farms rather more than counter-balanced this. On the whole, however, over a number of years, dairy farming in this district has proved a more profitable investment than arable farming.

Land utilization was fairly constant, though there was a slight increase in leys at the expense of permanent grass, and the tillage and total arable area increased between 1946 and 1947. Wheat occupied the largest acreage, and increased in area in 1947, though the average yield fell ; while barley and oats, though covering a lesser acreage, had higher average yields. Mixed corn increased both in acreage and in average yield per acre, but the area given to potatoes and roots was reduced. Though the acreage for permanent hay remained the same, the yield fell.

The money value of all production increased, due largely to the higher prices obtaining, though in the instance of milk the rise was small. On the expenditure account, the cost of purchased foods showed little change, and was 12.5 per cent of the total costs. There was a small increase in the cost of seeds and manures which were nine per cent of all costs.—A.D.H.

36 BRISTOL UNIVERSITY, Department of Agricultural Economics. Fmr's Rept. No. 58. **An economic study of sugar beet production in Devon and Cornwall. Crop year 1948.** By *S. T. Morris* and *S. A. Bradburn.* 1949. pp. 19. [Mimeographed]

Consideration of the costs, returns and margins per acre indicate the relatively fortunate position of these areas in the production of sugar beet. Cash margins ranged between nearly £12 per acre to over £23 per acre, and yields on average were about 13 tons per acre of clean beet compared with 8 or 9 tons in other parts of the country. Yet the local acreage represents less than 1 per cent of the total in England and Wales. Sugar beet is regarded as a cleaning crop in the rotation, and in most cases followed a cereal crop, though it sometimes followed potatoes, or leys. The crop has tended to be restricted to the larger farm.—A.D.H.

37 EDINBURGH AND EAST OF SCOTLAND College of Agriculture. Bull. No. 17. **Report on financial results of 48 East of Scotland farms, 1947-48, comprising Group I—28 hill sheep farms. Group II—20 stock rearing farms.** By *W. B. Duthie.* 1949. pp. 32.

As 96 per cent of Group I farms is composed of rough grazings, the chief factor determining the presence or otherwise of cattle is the availability of fodder and shelter during the winter months. It is evident that without the hill sheep subsidy they would not be able to carry on. Even on the better and more favourably situated hill farms of East and South-East Scotland hill sheep farming was not a very lucrative business. In Group 2, although a greater proportion of land was under crops and grass (approximately 10.5 per cent) intended partly for home consumption and partly for sale, these farms placed more emphasis on store cattle. Oat was the principal grain crop, and turnip the main root crop. Other crops were grown only in negligible quantities. The extent of the rough grazing and the elevation of the farm were the chief factors affecting the breed of sheep carried and the assessed rent per acre.

The expenses of feeding stuffs, seeds and manures show little year to year variation, and the sale of crops per 100 acres has remained steady over the last two years, though the net output has increased considerably. The small farms relatively highly capitalized for crop production and moderately highly for live stock failed to achieve a sufficient intensity of production to offset size limitation. The medium farms (500—1000 acres) highly capitalized in live stock but relatively less in crop production, show the highest return on capital. On the most extensive farms even the extensive acreage is insufficient to offset the low production capacity in live stock and crops.—A.D.H.

38 EDINBURGH AND EAST OF SCOTLAND College of Agriculture Bull. 19. **Report on financial results of 143 East of Scotland farms for 1947-48, comprising group III. 34 stock-raising and feeding farms. Group IV. 67 arable farms. Group V. 42 dairy farms.** By *D. M. R. Leask.* 1949. pp. 48.

The greater part of the income of the Group 3 farms is derived from live stock and live-stock products, but the production of crops for direct sale also forms an important part of their economy. Sheep and wool provide the largest individual share of the total output and cash income. Despite the fact that the average capital investment in cattle equals that of sheep, the income from cattle is less than that from cash crops. Arable crops, including hay, account for about a third of the total area of the farms, and are second in importance in the farm income. Two-thirds of the remainder is under rotation and permanent pasture and the rest is rough grazing. Oat is the most important, and provides the largest cash income of the tillage crops. Potatoes are grown on all farms, and are next in importance to oats, though their acreage was somewhat reduced in 1947-8.

The average profit obtained is scarcely an adequate return for the input of time and labour, but showed a slight improvement in 1946-7, since the net output for live stock and live-stock products increased considerably and that for crops also showed a slight increase, higher returns for roots, hay and straw off-setting the reduced output from barley and potatoes.

Two-thirds of the area of Group 4 farms are under arable crops, and the output of cash crops, chiefly grain and potatoes, is double that of live stock, though the emphasis on live stock is more marked than formerly, beef production being rather more important and barley and potatoes rather less. Both output and expenditure have risen continuously, but though profits show a decrease, they are still higher than on the other groups of farms. The farms north of the Forth relying mainly on potatoes and cattle earned considerably more profit than those south of the Forth. Group 5 with few exceptions is composed of arable farms on which dairy cows have replaced feeding cattle. Oat is the main tillage crop, with potato, wheat and barley next in order of importance. Milk sales are the most important single item, and show a slight increase. The average financial results appear more stable than on any of the other groups of farms. There was an increase in output, due largely to live stock and live-stock products, for that of crops changed little. Net expenditure showed an all-round increase especially for seeds and manures. A study of live-stock prices on all farms shows an increase in the gross profit margins, but it is highly problematical whether these will cover the increased costs. Acreage figures for crops indicate that the drop in wheat acreage has been checked. The decrease in yield and acreage for other crops was probably due to the bad season.—A.D.H.

39 EDINBURGH AND EAST OF SCOTLAND College of Agriculture. Bulletin No. 16. **Economic aspects of farm mechanisation. Combine harvesters in east and south-east Scotland. 1947.** By *H. Christine McIver.* 1948. pp. 29.

The average acreage harvested per combine each season is gradually increasing, for the costs of combine harvesting in an extremely bad season are in any case only slightly higher than in a good season and in every case save labour.

As might be expected, the 12 feet cut machines harvested wheat more rapidly than either barley or oats, and the yield of barley they combined was considerably lighter than the yield of oats. The percentage of wheat combined remained steady at 10 per cent (one biscuit firm prefers wheat harvested by combine), that of barley rose to 75 per cent, while that of oats decreased to 15 per cent. Since combining reduces the value of wheat and oat straw, it is a factor militating against the use of combines for these crops. The percentage of grain grown on each farm which was harvested by combine also showed an increase in 1947. The most striking difference between this and earlier years was the large increase in the percentage of farms where all barley and oats were combined, indicating increased reliance on the combine in a good harvesting season.

Plumage and Spratt Archer were the most popular varieties of barley since they give higher yields, and stand up better to the short dry growing season. For oats, Star and Ayr Commando were most in demand. A tendency to sow winter varieties of barley and oats became more pronounced.

Wheat was the cheapest crop to combine in 1945, 1946 and 1947, while oats were again the most expensive. All costs per acre were much lower than in previous years, but owing to the light yields the cost per hundredweight was considerably higher. Combine harvesting in Scotland due to high costs and uncertain weather is never likely to be very cheap, but it does save labour and grain. From the wide variations in costs, it seems that the process of bagging, carting and dressing the grain could sometimes be improved. The provision of grain drying and storage facilities also needs consideration before combine harvesting can be increased.

There was a noticeable tendency to collect more straw in 1947, and less straw was burnt. More wheat straw was ploughed in than previously. None of the oat straw was burnt, and considerably more of the barley straw was collected. Pick-up baling was the most popular method of dealing with the straw.—A.D.H.

40 EDINBURGH AND EAST OF SCOTLAND College of Agriculture. Agricultural Economics Dept. Econ. Rept. No. 4. **Costs of growing sugar beet. 1948.** By *J. D. Nutt.* 1949. [Mimeographed]

Results indicated that with reasonable growing and harvesting conditions, the production of sugar beet is quite a profitable undertaking, and in addition provides a cheap and useful source of succulent food, and of winter feed. The crop formed less than half of 1 per cent of the tillage crop in 1948, though it has considerable importance in the economy of a good arable farm. It tends to be taken as part of the root break following a cereal crop, and is usually intensively manured. The average cost per acre was over £45, the cost of cultivating and harvesting the crop being a major item. It was evident that costs continue to increase except for the more static items, seed and rent. Despite this, results showed a profit of nearly £12 per acre for clean beet, and nearly £3 per acre for the value of the tops. It was clearly shown that tons per acre is the most important factor so long as the standard sugar content is maintained.—A.D.H.

41 MEDICI, G. Agricoltura contadina. [**Peasant agriculture.**] *Ital. agric.* 1949. **86.** 555-62.

This report was presented to the 7th International Conference of Agricultural Economists which was held at Stresa (Italy) in August, 1949. The author examines this form of agriculture in which cultivation of the land and cattle rearing is organized by a rural family; the latter can either own or rent the farm or accept the system of métayage. —E.B.

42 SOUTH AFRICA, Department of Agriculture. (Economic Series No. 34). Bull. No. 270. **Agro-economic survey of the Union.** 1948. pp. 200. 3 maps.

This economic survey of the 473,000 square miles of the Union was begun in October 1936. The present and first report outlines procedure and provides data relating to the six highly productive areas for crops under the main headings: situation, topography, climate, rainfall, soil, vegetation, farming systems, soil utilization, crops, live stock, capital investment, and sources of cash income. The six areas are confined within the dryland farming areas of the Inland Plateau; a system of mixed farming is followed and generally maize is the principal crop.

The Transvaal Highveld (B_1) Maize is the chief crop and, with teff, oats and potatoes, occupies 90 per cent of the cultivated area. Crops provide 73.4 per cent of the cash income, maize contributing (in percentages) 47.3, potatoes 23.3, beans 1.2, and teff 1.1 of the total income. The sheep and cattle industries are about equally important, yielding 11.5 and 11 per cent of the total income respectively.

The Northern Orange Free State (B_2) The four principal crops are maize, teff, oats and other fodder crops, representing 97.7 per cent of the cropped area. Stock farming is more important than crop growing: stock contribute 57.1 per cent of the gross cash income against 42.9 per cent yielded by crops. Maize yields 40.7 per cent of the income derived from crops. Cattle bring in 30.3 per cent as compared with 22.5 per cent for sheep of the total farm income.

The Calidon River Area (B_3). Wheat is the most important crop and yields 49.0 per cent of the total farm income. Maize contributes 13.5 per cent and potatoes 4.1 per cent of the income; oats and rye are grown. Cattle contribute 31.9 per cent and sheep only 7.1 per cent of the income.

The Western Transvaal Area (B_4). Maize, kaffir corn and cowpeas cover 94.8 per cent of the cropped area; crops contribute 76 per cent of the gross farm income, maize yielding 67.8 per cent, kaffir corn 5 per cent and beans 1.4 per cent. Cattle farming is more important than sheep farming, representing 14.2 per cent of the total income as compared with 7 per cent represented by sheep.

The North-Western Orange Free State (B_5). The system is practically mono-cultural, 91 per cent of the cultivated area being under maize; cowpeas and fodder crops are grown. Maize yields 73.6 per cent of the gross farm income; the sheep industry yields 11.6 per cent and cattle 10.2 per cent.

Central Diversified Area (B_6). Maize, wheat, oats and teff cover 95 per cent of the total area cultivated. The crops contribute 59.4 per cent of gross farm income, maize yielding 35.5 per cent, wheat 18.2 per cent, and potatoes 4.8 per cent of the total income. Sheep contribute 18.6 per cent and cattle 17.8 per cent of the income.

The problems of the separate regions are discussed and recommendations made for meeting them. There are soil, rainfall, vegetation, agro-economic maps and a map showing distribution of native areas.—K.J.S.

43 JOLLY, A. L. **Peasant farming in two districts of the Oropouche Lagoon, June, 1944-5. Reports on an economic survey.** *Trop. Agriculture, Trin.* 1948. **25.** 23-32.

The survey includes information on receipts (per acre of crop) from rice, sugar cane, cacao and coffee, uncultivated and grazing areas; comparisons of costs and of incomes obtained when rice is grown as a sole crop and in rotation with dry-season crops are also considered.—M.H.

44 GRUEN, F. H. **Farm size and factors influencing changes in farm size with particular reference to New South Wales (1900-1948).** *Rev. Mktng* and *Agric. Econ.* 1949. **17.** 6-66.

The sub-division of estates, intensification of land use, taxation and legislation are all factors tending to decrease the average size of farms in New South Wales, while increased capitalization and labour efficiency, mechanization, and prices which are too low for the small farmers tend to increase the average size.

The intensification of land use between 1936 and 1945 resulted in four times as much green fodder being grown as in the period 1896 to 1905, thus enabling more live stock to be kept. The area under wheat was doubled, and more than twice as large an area was under crops in the second period. It was noted also that the average size of areas under wheat increased, but that there was a decline in the numbers of small areas sown with wheat. This was possibly the effect of the progress in mechanization which by 1946 was three times more widespread than between 1930 and 1939. It was estimated that for the optimum use of mechanization, an area of over 400 acres in extent was desirable for growing wheat most profitably. It was, however, concluded that the increase of output per acre without improvement in methods or change in land utilization led to a reduction in production per man, and that the tendency of production per acre to decline, and production per worker to increase as size of holding increases needed further study to establish a balanced economy. In the United Kingdom, only farms of more than 400 acres have the highest efficiency per acre and per worker. The question, too, as to whether or not the smaller farms have a more detrimental effect on soil erosion and fertility has yet to be investigated. In New South Wales the average size of farms has increased by 32 per cent since 1914.—A.D.H.

CROPS IN GENERAL

Varieties

45 FARMER AND STOCKBREEDER. **Variety trials at Sprowston.** *Fmr and Stk-Breed.* 1949. **63.** 1958.

A series of experiments have recently been carried out at the Norfolk Agricultural Station on new French wheats, Scandinavian barleys and precision-drilled rubbed beet. There were 400 trial plots of cereals of the New French wheats, usually short and stiff in the straw, early maturing and fairly disease resistant ; Nord Desprez and Hybrid 46 were the most promising. Eroke and Pilot, of the Scandinavian wheats, showed improved milling qualities. There were no spectacular achievements in the new Scandinavian barleys and rapes were tried in the interest of commercial oil production.

The acquisition of a new American precision drill, the Milton, simplified singling of sugar beet, reducing time by 10 per cent. Fields grown from rubbed seed drilled with this machine looked extremely healthy.—E.B.H.

Seeds

46 WAGENINGEN, Rijkscommissie voor de Samenstelling der Rassenlijst voor Landbouwgewassen. Vier en twintigste beschrijvende rassenlijst voor landbouwgewassen. 1949. [**Twenty-fourth descriptive list of varieties of field crops.**] 1949. pp. 258 [Separate English commentary, pp. 19.]

" Only certified seed and planting material may be brought into circulation in the Netherlands or be exported." A list of recommended and tested varieties is published annually by the Government for the guidance of farmers and others. The English commentary gives a full explanation of this list and of the organization controlling seed production in the Netherlands.—G.M.R.

47 PLAUT, M., and GABRIELIT-GELMOND, Ch. **Determination of the viability of seeds of some vegetable and field crops by means of sodium selenite.** *Proc. int. Seed Test. Ass.* 1949. **14.** 190-211. [Agric. Res. Sta., Rehovot, Israel]

The potential value of staining by sodium selenite and other reagents in determining the viability of seeds is discussed. Plants so far found to respond to treatment with salts of selenium, tellurium, or with 2,3,5-triphenyl-tetrazolonium chloride are tabulated. The table includes a number of important cereal, forage and vegetable crops (*Triticum* spp., *Avena sativa*, *Hordeum vulgare*, *Oryza sativa*, *Medicago sativa* etc.)—M.L.Y.

48 BERG, Måns. Undersøkningar av vattenhalt och kvalitet hos skørdetrøskad spannmål. [**Investigations of moisture content and quality in combined grain.**] *Norsk Landbr.* 1949. **15.** 301-3.

A brief account is given of the results obtained at the Swedish Institute of Agricultural Engineering, Ultuna.

Baking quality does not appear to be affected by time of harvesting or method of harvesting provided the crop is not exposed to sprouting. Where sprouting has occurred, direct threshing or combining with subsequent hot-air drying is the best harvesting method to preserve good baking quality. Germinating capacity is satisfactory with direct threshing or combining only if the moisture content of grain when harvested is approximately 20 per cent or less.—R.P.J.

49 POULSEN, V. Mejetærskning af Frø. [**Combining of seed.**] *Dansk Frøavl* 1949. **32.** 222-3.

Suitable seed crops for combining, provided adequate precautions are taken regarding weathering, speed of cylinder, etc., are swedes and turnips, rape, yellow mustard, brown mustard, poppy, peas and lupins, and oil flax.—R.P.J.

50 FÅHRAEUS, G., NILSSON, R., and SUNDELIN, G. Behandling av utsäde med Azotobacter kulturer, radivit och euradin. Försök med stråsäd och potatis. [**Treatment of seed with Azotobacter cultures, radivit and euradin. Experiments with cereals and potatoes.**] *Lantbruks. Jordbruk. Medd.* 24. 1948. pp. 5-49. [English summary, 45-7.]

During 1942-43 in southern and central Sweden forty-eight field trials were carried out to determine the effect on yield of inoculation of seed of barley, oats and potatoes with azotobacter cultures. In 1942 five pot trials were also conducted with oats as experimental plants. Inoculation with azotobacter cultures and addition of radivit has on the whole no effect with barley, oats and potatoes, so that this treatment is of no importance for practical agriculture.—R.P.J.

51 ANDRÉN, F. Beta utsädet det lönar sig. [**Disinfect seed—it pays**] *Lantm. Svenskt Land* 1949. **33.** 627-8.

Directions are given for disinfection of seed of autumn-sown crops. In addition to seed of cereal crops seed of oil crops, particularly autumn rape, should be treated.

In Finland E. A. Jamalainen found that disinfection during a 10-year period increased the yield of autumn-sown cereal crops by an average of 10 per cent. The mean increase depended on the conditions for snow mould development, and in some years amounted to 70 per cent.

In Sweden disinfection trials have been conducted with autumn rye, autumn wheat, barley and oats during the period 1938-48 at different centres from Scania to Jämtland. The results correspond with those obtained in Finland. Disinfection of seed should be conducted on a more extensive scale in Sweden: on the average the amount of all seed grain disinfected probably does not exceed 40 to 50 per cent.—R.P.J.

52 TODARO, F. La buona semente. [**Good seed.**] *Ital. agric.* 1949. **86.** 463-7.

This popular article gives information on the ways of obtaining good seed and on the organizations which deal with this matter in Italy.—E.B.

53 BREESE, M. H. **The storage of maize and pulse crops. II.** *Nyasaland agric. quart. J.* 1948. **7.** 77-83.

See *Fld Crop Abstr.* 2. Abs. 540.

54 DEXTER, S. T. **A modified wet and dry-bulb thermometer technique for determining the moisture content or storage qualities of so-called dry materials.** *Quart. Bull. Mich. agric. Exp. Sta.* 1949. **31.** 275-86.

The object was to use a solution from which there would be only a very slight evaporation at the relative humidity maintained by the sample in a closed container. Sodium chloride is suitable for farm grains such as wheat (15 per cent moisture content) as it maintains a relative humidity of 75 per cent. For drier materials, such as breakfast foods, other solutions such as magnesium chloride were used, and for higher relative humidities, potassium chromate or barium chloride solutions are successful. Experiments were carried out on wheat, corn, barley, oats, beans, sugar-beet pulp and breakfast foods. In every case, the heating or the cooling of the wet bulb should be small, for greatest accuracy.—E.B.H.

55 PALM, C. E. Cooperación internacional en la investigación científica, su aplicación a las problemas del control de plagas. [**International co-operation in research and its application to problems of insect control.**] *Agric. trop.* 1949. **5.** No. 2. 20-4. [Cornell Univ., Ithaca, New York]

Spanish version of an article published in " Preservation of grains in storage", pp. 161-6, issued by F.A.O., Washington, in 1948.—G.M.R.

56 ARRAZOLA, J. M., ANDRÉS, J. A., and TAGÜEÑA, J. M. X., Inoculación de las semillas de leguminosas con bacterias radicícolas. Experiencias sobre inoculación de garbanzos con preparados comerciales de *Rhizobium cicerii*. Tercera comunicación. [**Seed inoculation of leguminous plants with root bacteria. Trials on chick-pea inoculation with commercial preparations of *Rhizobium cicerii*. Third communication.**] *Bol. Inst. Invest. agron.* 1948. No. 19. 1-75. [English and French summaries 72-5.]

This article refers to field and plot trials carried out in 1944 in various Spanish regions, where legume growing is traditional, using the following treatments: (a) seeds inoculated and not treated with a fungicide; (b) seeds inoculated, treated with copper sulphate, and then washed in water; (c) seeds not inoculated, but treated with the fungicide as in (b); (d) control. Numerous observations are reported, but no definite conclusion is reached. It appears, however, that employing the same quantity of seeds, the plants from disinfected seeds are more prolific. Only in one district (Salamanca) has inoculation with *Rhizobium* proved clearly effective. It is evident that the strain of *Rhizobium* used should be superior to that already present in the soil. Field trials are not of much value (unless they are repeated for many years and with different climate and soil); they should be accompanied by laboratory trials.—E.B.

57 COLEMAN, F. B. **Quality of seeds for sowing.** *Qd agric. J.* 1949. **69.** 75-7.

This short paper comprises the text of a broadcast talk. Information is given on the technique of taking seed samples, tests for germination and the comparison of various lots of seed of differing purities and germination, a comparison which shows if the sample complies with the required standards.—P.M.

Fertilizers

58 Hende, A. van den. Vraagstukken van stikstof-huishouding. 2de mededeling. De giftigheid der nitrieten voor onze cultuurgewassen. **Problems of nitrogen fixation. 2nd communication. The toxicity of nitrites on cultivated plants.** *Med. LandbHogesch. Gent* 1949. **14.** 91-110. [French, English and German summaries, 108-9.] [Lab. Appl. Physics and Anal. Chem., Agric. Coll. Ghent, Belgium]

An account of 4-year field trials of $NaNO_2$ applied to turnips, mangolds, sugar beet, wheat, barley and oats. Turnips and mangolds suffered serious injury (burning) after the application of 800 and 1000 kg. $NaNO_2$ per hectare, but under the conditions of the trial the yield of turnips and wheat was not badly affected by an application of 200 kg. per ha., nor was that of barley and sugar beet by 500 kg. per ha. The presence of small amounts of $NaNO_2$ in commercial nitrates is unlikely to cause any marked reduction of crop yield.—From author's summary.

Weeds

59 Greenham, C. G. and Cole, D. J. **Diagnosis of death in roots.** *Nature, Lond.* 1949. **164.** 669. [Div. Pl. Ind., Canberra (C.G.G.) and formerly Div. Electrotech. Sydney, N.S.W. (D.J.C.)]

The authors have devised a simple method for determining the depth to which roots or underground stems of perennial weeds have been killed following application of a poison to their tops. The equipment consists of a probe and a portable A.C. bridge, details of which are to be published elsewhere.—m.h.

60 Hofsten, C. G. von. Höstbesprutning mot ogräs är aktuell. [**Autumn spraying to combat weeds is a topical question.**] *Lantm. Svenskt Land.* 1949. **33.** 591-2.

The effectiveness of autumn spraying has been demonstrated in the experiments conducted in Sweden by the State Institute of Agricultural Research and the Institute of Crop Production of the College of Agriculture. Attention is invited to the publications "Weed control by hormone derivatives," in which spraying autumn-sown cereal crops in the autumn is stated to be the most successful method of combating annual autumn-germinating weeds. Scentless mayweed (*Matricaria inodora*) is more serious in the earlier sown rye than in wheat. Autumn spraying of autumn-sown cereal crops should not take place earlier than 5 weeks after sowing.—r.p.j.

61 Lhoste, J., and Ravault, L. Etude de l'action de l'INPC sur quelques végétaux. [**Study of the action of isopropyl N phenyl carbamate on certain plants.**] *C. R. Acad. Agric. France.* 1948. **34.** 1007-10.

The effects of the INPC weed killer on Gramineae and on Cruciferae such as *Brassica oleracea*, *B. napus*, *Raphanus sativus* and *Sinapis arvensis* have been studied. Results indicate that this method of eradication opens up definite possibilities. It should be noted, however, that instability of INPC (10-11-12) is shown in that 30 days after treatment the soil loses its phytocide property.—m.l.y.

62 Sarfatti, G. Ricerche sulla flora infestante delle culture in Italia. 1. Introduzione bibliografica e metodologica. [**Researches on weeds of cultivated land in Italy. 1. Bibliographical and methodological introduction.**] *Nuovo G. bot. ital.* 1948. **55.** 527-58.

63 Ciconi, C. A. Riduzione ad oltre un quinto delle spese di monda ? [**Are the weeding expenses going to be reduced to less than a fifth** ?] *G. Agric. Domen.* 1949. **59.** 246.

This article refers to weeding trials in the rice fields with selective herbicides, namely 2-4 Dow, Agroxone and Weedone, employing the Berthoud motopump which is horse-drawn and can cover 2 hectares per hour (see also *Fld Crop Abstr.* 2., Abs. 872.—e.b.

64 Baumgartner, L. L., and Wolf, B. **Sodium isopropylxanthate as a new selective herbicide.** *Contr. Boyce Thompson Inst.* 1949. **15.** 403-10. [Boyce Thompson Inst. Plant Res., Inc. Yonkers 3, N.Y. (L.L.B.) and Seabrook Fms, Bridgeton N.J. (B.W.)]

Data on the use of sodium isopropylxanthate as a new selective weed killer are presented. It controlled annual weeds such as purslane, pigweed, bedstraw, lamb's quarters, henbit, and ragweed, in lima beans, peas, and cabbage. Application of this herbicide at rates of 10 to 12 lb. per acre selectively killed annual weeds in peas and beans, without causing injury to the crops. Rates above 15 lb. per acre caused injury to peas. Cabbage was not seriously injured when sprayed at the rate of 17 lb. per acre. This herbicide, possessing high water solubility, can be applied as a dust or liquid spray. —Authors' summary.

65 Wolcott, A. R., and Carlson, R. F. **Weed competition in small grains in the Upper Peninsula.** *Quart. Bull. Mich. agric. exp. Sta.* 1949. **31.** 482-7.

Attention is directed to the importance of the underground rhizome growth of quack grass growing in competition with grain crops. In experimental plots described and illustrated, an apparent 28 per cent infestation of quack grass (based on surface growth) reduced grain yields as much as did a 53 per cent infestation of Canada thistle, the growth of which was much more evident. The yield decrease was 30 per cent in both cases. The particular quack infestation was not extreme.—K.J.S.

66 MINNESOTA Agricultural Experiment Station. Bull. 397. **Weed seedlings.** By *R. S. Dunham*, *A. H. Larson* and *R. G. Robinson*. 1947. pp. 36.

This bulletin gives diagramatic representations and short, simple, descriptions of the cotyledons, leaves and hypocotyl of the more common weed seedlings of American crops.—K.O.

67 WOLF, D. E. **Progress in chemical weed control.** *Agric. Engng St. Joseph, Mich.* 1949. **30.** 78-80.

Crop yields in North America have been so severely affected by weed interference, that all phases of control are being closely examined by research authorities in all parts of the United States and Canada. The author traces developments since the early days of weed control in the latter part of the 19th century, when arsenical compounds were to the fore. Up to 1944, selective weed killers were studied in relation to morphological differences between crop plants and weeds. It was discovered also that selective sprays such as sulphuric acid combined weed killing with fertilizer value. The discovery that certain growth regulating substances had weed-killing properties has since revolutionized methods of attack. Selective action in this case is allied to physiological rather than morphological differences. This is demonstrated in the effects produced by the now popular 2,4-dichlorophenoxyacetic acid (2,4-D) herbicide. The value of this weed killer after the crop is sown but before it emerges is stressed. This was demonstrated at the New Jersey Agricultural Experiment Station in 1946, and subsequent observations confirm earlier results. The use of calcium cyanamide as a "pre-emergence" treatment is also of interest; 300 lb. per acre applied just after maize was planted has resulted in double yield (77.9 bu. per acre compared with 37.1 bu. control).

Research with spray nozzles and pumps to ensure accuracy of coverage still requires attention. Constant pressure is essential and lack of uniformity might explain some of the erratic results obtained when 2,4-D has been used.—M.L.Y.

68 BARRONS, K. C. **Pre-emergence weed control. A summary of chemical methods for use prior to crop emergence.** *Down to Earth.* 1948. **4.** 2-4. [Dow Chemical Co.]

Residual pre-emergence treatment with 2,4-D and with phenolic compounds is reviewed. Crops such as sugar cane, sorghum and potatoes withstand 2,4-D, presumably because their roots are protected by relatively deep planting. Depth protection is important in regard to the phenolic compounds. Beans, maize and cotton have been treated successfully.—K.J.S.

69 COULTER, L. L. **Aerial application of 2,4-D alkanolamine salt in water shows promise on small grains.** *Down to Earth.* 1949. **4.** 13.

In experiments on wheat and barley, which do not develop a dense ground cover at full tillering, aerial application of one pint of 2,4-Dow Weedkiller Formula 40 in as little as one gallon of water per acre controlled many weeds such as mustard and lamb's quarters. The amine formulation in water is claimed to have greater range in selectivity than other 2,4-D formulations, and water is a cheaper carrier than the fuel oil used with ester formulations.—K.J.S.

70 WILSON, J. R. W. **Role of the helicopter in applying 2,4-D and pest control chemicals.** *Agric. Chem.* 1949. **4.** 22-6.

Based on one season's helicopter spraying of about 13,000 acres in California, the helicopter seems to have the advantages of manœuverability and access over the ordinary aeroplane. Tracks and winding streams can be sprayed, using the proper 2,4-D formulations. The downwash of spray due to the overhead rotor tends to lessen drifting, to direct the spray downwards and to enable the spray to reach weeds in tall or dense growths. Good results have been obtained in spraying rough pigweed (*Amaranthus retroflexus*) in the Sacramento Valley, California, and in rice fields. Defoliants for cotton reached the lower leaves in helicopter spraying.—K.J.S.

71 WHITE, C. T. **Star thistle—a new weed pest.** *Qd agric. J.* 1949. **69.** 84-5.

Centaurea calcitrapa appeared in south-eastern Queensland in 1948. The weed is already well established in the southern States of Australia. In these latter areas, hormone weed killers have been used against serious infestations. Where the weed occurs only sparsely, hand-pulling and cutting several inches below the soil surface are recommended.—P.M.

72 CABRERA, Á. L. Sinopsis del género *Soliva* (Compositae). [**Synopsis of the genus *Soliva*.**] *Notas Mus. La Plata* 1949. **14.** Bot. No. 70. 123-39.

Taxonomic study of plants which, while not yet dangerous weeds, are so abundant in certain places and seasons and are so readily distributed in the fleeces and hides of animals that they might at any time become a hindrance to agriculture.—G.M.R.

Machinery and Equipment

73 Phillipson, A. **Development in farm mechanization in Great Britain.** *Brit. agric. Bull.* 1948. **1.** 73-80.

This is a brief review of machinery being developed and a consideration of recent trends of development.

Tractors. There has been great increase in production of medium-powered wheeled tractors. They are mainly general purpose machines and thus have greater axle clearance than earlier models. A significant trend is the almost universal adoption of the hydraulic lift in conjunction with directly attached implements and an increasing use of power take-off. Apart from several light row-crop tractors, self propelled tool chassis are being produced : these are mainly for use in market gardens.

Ploughs. The mouldboard plough remains the most popular. Tractor ploughs are similar to American models, but there is a tendency towards use of a sharper turning mouldboard ; this leaves the furrow slice more broken.

Cultivating equipment. Toothed harrows can be cleared of trash by using a tractor with a hydraulic lift ; another harrow has "walkers" operated by a trip rope which performs the same task.

Regarding other branches of farm machinery, mention is made of a drill used when sowing sugar beet, which consists of a revolving metal cylinder indented in the circumference to hold decorticated seed, and of potato planting machines (not fully automatic). There is mention of new lime spreaders, mechanical dung loaders, insecticide sprayers and dusters, combine harvesters and potato lifters. Great strides have been made in sugar beet harvesting, and progress is briefly reviewed. The article is well illustrated.—P.M.

74 Farm Mechanization. **The Bentall-Kent mounted gapper.** *Fm Mech.* 1949. **3.** 119.

This machine is a development of the well-known single-row horse drawn implement and has the advantage of saving time, after which the crop can be handled by less trained labour. The latest model consists of two independent units, each adjustable for various road widths, and provided with non-gapping lifters. The best results are obtained when drills have not been precleaned, but when possible have been rolled after sowing. Plants should be at least 2 inches high before use is made of this implement.—M.L.Y.

75 Rowsell, J. **Grain storage vital.** *Fmr and Stk-Breed.* 1949. **63.** 2022.

The author lists his reasons for advocating orthodox methods of grain storage. Unorthodox methods, such as sacking grain in the field or storing it in ventilated bins, whilst justifiable to the small farmer, involve too great a risk of loss on a larger farm where installation of efficient, tested equipment would be more economic.

A 300 to 400-acre farm (50 per cent cereals) requires a combine, an efficient drier and storage space for two-thirds of the grain. Concrete self-emptying silos are recommended for storage, but it is essential to be able to turn the bins either amongst themselves or around the drier. Elevators will do all the conveying very cheaply. They are simple to operate and easy to clean. Expanding spouts attached to the elevator, which can be swung over the appropriate bin, obviate dangers of mixing. In addition, remote control thermometers are considered a good investment.

Thus, after the expense of the initial outlay the farmer reaps dividends in freedom from anxiety, and in grain and labour saved.—E.B.H.

76 КЛЮЧНИКОВ, А. И. Квадратно–гнездовые посевы пропашных культур. *Совет. Агрон.* 1949. *No.* 3. стр. 77-82.

Ključnikov, A. I. [**Square-pocket seeding of hoed crops.**] *Sovet. Agron.* 1949. 77-82. [U.S.S.R. Sci. Res. Inst. for Soybean and *Ricinus*.]

Square-pocket sowing of maize, sunflower, castor-oil and other hoed crops, which, saving 50-60 per cent of seed and facilitating mechanical cultivation, can be effected by a new machine, the features of which are briefly described. This six-coulter machine is equipped with specially designed coulters and a mechanism which ensures an even distribution of pockets in the drills and the straightness of the cross rows. The capacity of the sowing machine when coupled with a tractor is 12-15 ha. per 10-hour working day.—M.A.O.

77 Farm Mechanization. **"Wild" Gang Seeder** *Fm Mech.* 1949. **3.** 115.

This type of seeder is designed for direct attachment to the power-lift of Ferguson Fordson Major tractors or "Cropmaster" tractors. The hydraulic unit is operated by a chain drive from the tractor power take-off and is claimed to have a lifting capacity of 10 cwt. The power-lift is so adapted to ease driving at headland turnings or to-and-from the field and avoids seed wastage. The independent mounting of the coulter units copes with ground irregularities and ensures a constant depth of drill. The seeder is available in 4-row or 6-row forms and row spacings from 9 in. to 27 in. at 3 in. intervals are possible. —M.L.Y.

78 Grafius, J. E. **A four-row nursery seeder.** *Agron. J.* 1949. **41.** 267-9. [S. Dakota Agric. Exp. Sta.]

Features of the seeder are described. The divider operates on the principle of a splash system on horizontal baffles, in contrast to the vertical division by most dividers. In use, a map is carried on the drill to ensure correct seeding order on the plots. The chassis of the seeder can be used for cultivation when fitted with suitable attachments.

The seeder allows two men to maintain an average of 200 plots or 800 rows an hour.—K.J.S.

79 Higgs, J. W. Y. **African development in agricultural mechanization.** *Fm Mech.* 1949. **18.** 90-1.

A review of the three main technical problems involved in African farm mechanization, namely, the production of adequate quantities of suitable types of machinery ; the provision of good servicing and supply facilities within each territory ; and the education of agricultural officers in the use of all types of machinery.—M.L.Y.

80 Hardy, E. A. **Mechanization for farming.** *Agric. Inst. Rev.* 1949. **4.** 279-84. [Ottawa]

81 Poor, D. B. **An adaptation of drying corn with forced air.** *Agric. Engng St. Joseph, Mich.* 1949. **30.** 71-2 and 77.

A description is given of the "Quonset 32" the use of which has proved to be a practical economic method of drying and storing wheat and other grain.—M.L.Y.

82 Nebraska Agricultural Experiment Station. Bull. 392. **The Nebraska tractor tests 1920-1948.** 1949. pp. 51.

Diseases and Pests

83 Petersen, H. I. and Thorup, S. Deformiteter, fremkaldt af hormon-præparater, kan forveksles med angreb af skadedyr eller plantesygdomme. [**Deformities occasioned by hormone preparations may be mistaken for attack by pests or plant diseases.**] *Ugeskr. Landm.* 1949. **94.** 127-30. [State Weed Research Station, Lyngby, Denmark]

In many cultivated plants, hormone preparations occasion deformities which resemble the symptoms of attack by pests and plant diseases. Some of the most characteristic deformities are described and methods of distinguishing them from the disease symptoms with which they may be confused are noted. Beets may appear to be affected with chronic damping off or to be suffering from eelworm attack. Swedes may present the appearance of having been attacked by the swede midge (*Contarinia nasturtii*) or by club-root (*Plasmodiophora brassicae*). Swedes are extremely susceptible and are killed by quite small amounts of the preparations. Carrots frequently appear to have been attacked by *Trioza apicalis*. Injury to potatoes resembles that caused by virus diseases. In wheat the ears may be longer and more open than normally, resembling ears attacked by bunt.—R.P.J.

84 Grøntved, P. Havreaalen er ved at blive en alvorlig Fare for var Korndyrkning. [**The oat eelworm is becoming a serious danger to cereal crop cultivation in Denmark.**] *Ugeskr. Landm.* 1949. **94.** 535-7.

In 1949 attacks by the corn eelworm have been unusually severe not only in oats, but also in barley and wheat. Denmark has no resistant oat varieties, but it is hoped that such varieties will be bred. The new slightly late Fero barley (previously Øtofte L. 64) has at Tystofte (1948) proved to be slightly less heavily attacked than the other modern varieties.

The most important measure for combating severe attack by the corn eelworm is for the present the institution of a rotation with as few susceptible crops as possible and the ensuring that two susceptible crops are not grown immediately after one another.

Investigations conducted by the agricultural societies in Jutland and on Fyn from 1935 to 1937 showed that eelworm attacks are particularly widespread on farms with a large grain crop area and that the attacks follow a too frequent cultivation of oats and mixed corn. The use of rye instead of wheat affords some protection against the oat eelworm, and the inclusion of 2-year grass leys in the rotation is an important preventive measure.—R.P.J.

85 ПАВЛОВ, И. Ф. Химический способ борьбы со стеблевой хлебной блохой. *Селек. Семеновод.* 1949. *No.* 6. стр. 57-8. Pavlov, I. F. [**Chemical means of combating the grain weevil**] *Selek. Semenovod.* 1949. No. 6. 57-8. [Penzensk Province Agric. Exp. Sta.]

Dusting with hexachlorine, DDT, silico-sodium fluoride and Paris green has a potent effect on the grain weevil. Hexachlorine and DDT are more effective than silico-sodium fluoride or Paris green, hexachlorine surpassing DDT slightly.—R.P.J.

86 Baldacci, E. Lo sviluppo degli anticrittogamici e dei mezzi di irrorazione negli ultimi anni. [**The development in recent years of fungicides and of means of spraying them.**] *Humus, Milan.* 1949. **5.** Nos. 7-8. 33-5.

The subject is reviewed. Information on some wheat, rice, and lucerne diseases is given.—E.B.

87 Locatelli, A. La specializzazione nei funghi patogeni. [**Specialization in pathogenic fungi.**] *Ital. agric.* 1949. **86.** 588-90.

As numerous races with different virulence are recognized in the fungi causing various plant diseases (*Puccinia*, *Ustilago*, etc.), it is advisable to carry out the selection of a resistant plant variety with infectious material derived from a wide geographical area.—E.B.

88 CIFERRI, R., and BERTOSSI, F. Vantaggi e svantaggi dell'insetticida esaclorocicloesano. [**Advantages and disadvantages of the insecticide gammexane.**] *Humus, Milan.* 1949. **5.** 6-10.

The matter is reviewed and comparison is made with DDT.—E.B.

89 MORETTI, G. P. Attuali problemi della produzione e dell'uso degli insetticidi in Italia. [**Present problems of production and use of insecticides in Italy**] *Humus, Milan.* 1949. **5.** Nos. 7-8. 23-31.

The principal compounds are examined and indication is given of their particular use.—E.B.

90 TITTLEY, E. A. Le BHC, rival du DDT. [**BHC, rival of DDT.**] *Rev. d'Oka* 1949. **33.** 199-244.

The author considers the economic importance of insects, their control, their relations with the insecticide and the plant and reviews work on modern insecticides. Extensive information on BHC (hexachlorocyclohexane) is given including control of particular plant pests. A bibliography of 116 references completes the article.—E.B.

91 WALZ, J. **The role of insecticides in seed production.** *Seed World.* 1949. **64.** 42 and 44.

DDT has a wide control range but is ineffective against aphids and mites.

BHC666 contains 8 isomers of which only 1 has insecticidal properties. It is more toxic than DDT to plants, affects germination and tends to impart its pungent taste and smell to vegetables and fruit.

Parathion is very slightly soluble in water, does not hydrolize and is not compatible with alkaline insecticides, and fungicides. It is highly toxic to warm-blooded animals but is safer in dust form. Combined with DDT it controls pests outside the range of DDT.

Hexaethyl tetraphosphate (Bladen) is an amber coloured liquid which has been used against aphids and mites with varying success.

Tetraethyl pyrophosphate hydrolizes readily with the production of a strong acid. There is no residual action. It controls most aphids and mites and is highly toxic to warm-blooded animals.

Rotenone controls a great variety of insects with no residual action. It is being replaced by newer and cheaper insecticides as is *Pyrethrum*.

Ryania is obtained from the roots of the South African *Ryania*; it is an effective contact and stomach poison, less toxic to animals than derris or cube. It has a good residual action.

Sabadilla is made from South American lily seeds (*Schoenocaulon*). It can be used effectively on squash bugs and on cucurbits where DDT cannot be used.

Piperonyl butoxide and piperonyl cyclonene are both pale yellow to clear liquids. Study of their effect is in the experimental stage but they appear to give a synergistic action with pyrethrum and to be of low toxicity.—E.B.H.

92 UNITED STATES, Department of Agriculture. Bureau of Entomology and Plant Quarantine. **Studies with DDT as a control for wireworms in irrigated lands.** Progress Report. By *M. C. Lane* et al. 1948. pp. 9.

Laboratory and field tests on the toxicity of DDT to the Pacific coast wireworm (*Limonius canus*) and the sugar beet wireworm (*L. californicus*) on irrigated lands, have been in progress for several years at Walla Walla, Wash. and Ventura, Calif. Direct applications of DDT are not very effective as the wireworms appear to be desiccated very slowly, often after egg laying has taken place. They are most vulnerable when very young. Low concentrations of DDT in the soil, however, are very toxic. Wireworms soon die, when in constant contact with the material in the soil, but it has no effect on eggs or pupae. 10 lb. of technical DDT mixed with soil to a depth of 6 to 9 in. is very effective and reduces damage for 3 seasons. It is stable in the soil and excessive dosages over a period of years will injure plants.—E.B.H.

93 HASKELL, R. J. **The role of alkyl mercury as a fungicide.** *Agric. Chem.* 1949. **4.** 30-2.

A table compiled at Beltsville lists about 50,000 separate diseases of economic plants, including 114 on maize, 127 on potatoes, eighty-eight on wheat, eighty in cotton; at least 500 diseases are seed-borne. Some instances of successful seed treatment in U.S. are given. Nearly all hybrid corn is treated before sale; formerly 50 to 75 per cent was dressed with ethyl mercury phosphate. Increases for cotton seed dressing are usually 10 to 15 per cent or higher; on an average 30 per cent of cotton seed is treated in U.S.A.—K.J.S.

94 HAEUSSLER, G. J. **Boll weevil infestation worst in years.** *Agric. Chem.* 1949. **4.** 49-50A.

A review of current insect control programmes in U.S.A. Boll weevil, more widespread in 1949 than at any time since 1941, was checked by hot weather and the wide use of insecticides, including calcium arsenate, DDT, BHC and toxaphene. Over 2 million acres of range in Montana and Wyoming were baited against grasshoppers, using 5 to 10 lb. bait per acre. In Texas chlordane and toxaphene were used successfully against grasshoppers; BHC dusts applied against cotton insects also controlled grasshoppers.—K.J.S.

95 BECK, S. D., and LILLY, J. H. **Report on European corn borer resistance investigations.** *Iowa St. Coll. J. Sci.* 1949. **23.** 249-59. [Dept. of Zoology and Econ. Entomol., Univ. Wisconsin]

The cyanogenetic property of sweet sorghum appears to be an important factor in resistance of the plant to attacks by young corn borer larvae, since a direct correlation was found between larval mortality and the amount of HCN generated by the sorghum host plants. The corn hybrids were cyanogenetic to a much smaller degree, and no such correlation was detected in them.—From authors' summary.

CEREALS

MISCELLANEOUS

96 SUNDELIN, G. Inför höstsädessådden. [**Sowing of autumn cereal crops**] *Lantm. Svenskt Land* 1949. **33.** 625-6.

During 1942-1946 the yields of autumn cereal crops amounted on the average for the whole of Sweden to 2200 kg. autumn wheat and 1800 kg. autumn rye per hectare. The best wheat yields were obtained in the province of Malmöhus with 2990 kg. grain per ha., closely followed by the provinces of Kristianstad and Östergötland with 2690 and 2550 kg. per ha. respectively. The province of Blekinge also exceeded the average with 2390 kg. per ha. The highest yields of rye were reported from the province of Malmöhus with 2350 kg. and the province of Östergötland with 2040 kg., while the provinces of Kristianstad, Södermanland and Uppsala had approximately 1950 and the provinces of Örebro, Jämtland and Stockholm approximately 1850 kg. per ha.

Field trials and also cultivation on a large scale when the results obtained in such trials (relating primarily to plant nutrition, varieties and weed control) are used in practical agriculture, show that hectare yields of 4000 kg. wheat and 3500 rye are easily attainable. As regards choice of varieties, for the uplands in Scania and Halland, Kungs II and Petkus II rye, and Eroica, Hansa and Skandia III wheat are particularly suitable. For other parts of Götland Kungs II rye is best suited to the heavy rainfall areas and Petkus II to the drier areas ; and the wheat varieties, Borg, Aros, Odin, Virtus and also Eroica give good results in favourable situations. Varieties suitable for cultivation in the Mälar and Hjälmar regions and also in Bergslagen are Kungs II, Petkus II and Stål rye, together with Björn in the more exposed localities, and Borg, Aros, Ergo, Odin and Virtus wheat. The new varieties in tests so far have given promising results. For the coastal area in Norrland the varieties of rye recommended are Stål and Björn in the southern part, and also further northwards (besides Björn and North Bothnia land rye) the Finnish varieties Toivo, Pekka and Oiva. The growing of autumn wheat is justifiable only in the coastal region of Gastrikland where in addition to land wheat the varieties Virtus, Svea II and Odin are suitable.—R.P.J.

97 THORPE, H. C. **A note on the release of some new cereal varieties.** *E. Afr. agric. J.* 1949. **14.** 210-1. [Dept. Agric., Kenya Colony]

The new cereal varieties described have been released to farmers from Departmental control for sowing in 1949. All have been tested in trial plots and large-scale field trials under farming conditions in Kenya. Varieties described are Wheat No. 318, A.J. 4. A1., Wheat No. 261, R.7.C. 1B, Wheat No. 117.A.11 (Pure or Regenerated), Rhodesian Sabanero wheat, Glacier barley and other new varieties.—K.O.

WHEAT

Agronomy

98 КУРИЛОВА, А. В. Чистые пары под яровую пшеницу. *Совет. Агрон.* 1949. *No.* 5. стр. 60-4.

KURILOVA, A. V. [**Spring wheat on bare fallow.**] *Sovet. Agron.* 1949. No. 5. 60-4.

Spring wheat is the principal crop in the Čkalov region. In experiments conducted in the province, in which sowing on fallow was compared with sowing on ploughed land, the yields of spring wheat on the average of 7 years amounted on ploughed land to 8.2 and on fallow to 11.9 centners per ha. : the yield of winter rye on fallow for the same years was 9.7 centners per ha. In some years (particularly when dry) the yields on fallow were more than twice as large as those on ploughed land. In 6 years out of 7 spring wheat on fallow was higher yielding than winter rye.

Spring wheat crops on fallow are less weedy. In cultivation on fallow, retention of the snow is of great importance. In this connexion the utilization of coulisses of tall growing plants (e.g. sunflower) has given the best results. By sowing spring wheat on fallow the yield was increased by 5.34 centners per ha. Retention of the snow by coulisses of sunflower (summer sowing) gave in the wet year 1947 a further increase of approximately 3 centners grain per ha.—R.P.J.

99 КРУТИХОВСКИЙ, В. К. О летних посевах озимой пшеницы. *Селек. Семеновод.* 1949. *No.* 5. 64-7.

KRUTIHOVSKIĬ, V. K. [**Summer sowings of winter wheat.**] *Selek. Semenovod.* 1949. No. 5. 64-7.

Summer sowings (June and July) of winter wheat, in contrast to August sowings on the most suitable dates (17th and 23rd) are liable to attack by rust in the year of sowing. In some years rust attack may be so severe that the winter crop perishes before the beginning of winter. It may be assumed that there is a risk of considerable damage to the seedlings of summer sowings by such pests as aphis and cicadas, while the flight of these insects has ceased at the time of the appearance of the seedlings of August sowings made at the most suitable dates. The opinion that summer sowings of winter wheat are more winter hardy than August sowings is refuted conclusively.

Conditions in June and July (heat and heavy rain, resulting in the formation of crust on the surface of the soil) are not favourable for obtaining a normally dense stand of seedlings, while conditions in the second half of August are in general very favourable for securing excellent seedlings (good moisture of tilled soil after summer rain, lower temperatures than in summer and active evaporation). Summer sowings of winter wheat, particularly those made in June, soon after germination are seriously invaded by weeds and special measures are necessary to combat them, while normal August sowings from the autumn are usually altogether free from weeds. The utilization of summer sowings to obtain fodder in the year of sowing is not economic. Certainly June sowings enable hay to be harvested in the first half of September, but the amount harvested is so small that it can hardly be compared with the hay yields from a vetch-oat mixture.—R.P.J.

100 КУЗЬМИН, В. П. Опыт посева сортосмеси яровой пшеницы. *Селек. Семеновод.* 1949. *No.* 3. стр. 22-7.

KUZJMIN, V. P. [**Experiment in sowing varietal mixtures of spring wheat.**] *Selek. Semenovod.* 1949. No. 3. 22-7.

An experiment in sowing a mixture of varieties of spring wheat of different types, under conditions of wet and dry years, showed that the yield of a mixture of varieties suitably selected keeps on the level of the highest yielding variety in the given year. The increase in yield of the mixture compared with that of the varieties included in it was from 1 to 3 centners per ha., or 20 to 40 per cent.—R.P.J.

101 БРУК, Б. Л. Причины выпадения растений яровой пшеницы в условиях Дальнего Востока. *Селек. Семеновод.* 1949. *No.* 2. стр. 38-42.

BRUK, B. L. [**Causes of perishing of spring wheat plants under conditions prevailing in the Far East.**] *Selek. Semenovod.* 1949. No. 2. 38-42. [Far East Sci. Res. Inst. Agric., and Anim. Husb.]

In "perished" wheat plants the main stem is unable to yield viable seeds as a result of injury to the growing point or other abnormalities of growth and development. It was possible to determine cases of "perishing" in the 5th—6th leaf phase. The number of "perished" plants constituted 11.3 per cent of the number of seedlings. Of all the cases cited only the appearance of infantilism (43 per cent) can be in some measure connected with "intra-species competition", with reciprocal depression and reciprocal limitation of the wheat plants. But in relation to this group it cannot be asserted that "intra-species competition" is the principal or the only cause of perishing. Such causes were also quality of the seed, late appearance of the seedlings, too shallow or too deep sowing, and other ecological factors weakening initial growth, as a result of which the crop was depressed by the surrounding plants. The spreading of "infantilism" did not exhibit a regular connexion with density of the stand of wheat.—R.P.J.

102 ULRICH, R., and ILDIS, P. Quelques remarques sur la végétation des blés semés tardivement. [**Some observations on the vegetation of late sown wheats.**] *C. R. Acad. Agric. France* 1949. **35.** 94-5.

Results obtained in 1947-48 with sowings of different varieties of wheat, vernalized and unvernalized, confirmed earlier recorded observations made by Lysenko, Friedberg and David. The curious behaviour, however, of the two varieties Vilmorin 23 and Vilmorin 27, late-sown on 8th and 1st of March respectively, has been observed. Neither of these varieties had been subjected to cold treatment. Growth was rapid and dense, but no ear development was expected. It was a surprise, therefore, that in both cases the plants eared normally in June and that the ears were more profuse at the end of August than on vernalized and normal plots. This suggests some distinguishing factor which affects the normal development of the caryopses. Variety characteristics and certain conditions may have some influence. It should be noted that although ears were formed, the grain was relatively sparse and small and the yield poor and late as compared with that of the control plot. The vernalized plot was sown on the same date and reproduction was normal.

According to Lysenko, the conditions required by the plant for completion of the thermophase are low temperature combined with suitable environmental conditions. The fact that the plants in the present case received no cold treatment at the first stage has, however, led the authors to conjecture as to whether the thermophase is indispensable in the case of these two varieties, and whether this stage should not more correctly be referred to as a cryophase.—M.L.Y.

103 PEGLION, V. Grani illesi e grani criptolesionati posti a raffronto nella grande coltura. [**Sound wheat grains and those with hidden injury compared in wide cultivation**] *G. Agric. Domen.* 1949. **59.** 321.

Results of some early trials show the advantages obtained by employing uninjured seed. These advantages are lower quantity of seed required, higher yield, and increased rust resistance.—E.B.

104 YEPES Y., E. A. Investigaciones sobre la producción del trigo en Mexico y observaciones sobre su cultivo en Colombia. [**Investigations on the production of wheat in Mexico and observations on its cultivation in Colombia.**] *Rev. Fac. Agron. Medellín* 1948. **8**. 59-78.

Summary of thesis presented to the Fac. Agron. Medellín, Colombia. The first half consists of a general study of factors concerned in wheat cultivation—history, economics, climate, soil, health, technique—together with the author's observations on special conditions affecting wheat growing in Mexico and Colombia. The second half of the article describes experimental work on sowing technique, irrigation and manurial treatment done by the author in the Valley of Mexico. The following are some of the results recorded. Irrigation was not found to increase attack by *Puccinia graminis* and *P. glumarum*, but it increased yields, in unmanured plots by 446 kg. per hectare, in manured plots by 468 kg. per ha. Excessive quantities of water reduced the proportion of grain. The factor most effective in increasing yield was suitable manurial treatment, in which the importance of phosphorus is noted. Seeding rates of 25, 50 and 75 kg. per ha., either drilled or broadcast, were ested, and 50 kg. per ha. in 20 cm. drills was found o result in the most uniform stand and the best germination, tillering, vegetative development and yield.—G.M.R.

Varieties

05 ЛЕЩЕНКО, П. И. Опыт селекции высокопродуктивных озимых сортов пшеницы в Фергане. *Селек. Семеновод.* 1949. *No.* 7. стр. 41-3.

LEŠČENKO, P. I. [**Experiment in breeding high-yielding winter varieties of wheat in Fergana.**] *Selek. Semenovod.* 1949. No. 7. 41-3. [Fergana Zonal Station for Cotton/Lucerne]

An account is given of work with branched wheat which was begun in 1945 and is still in progress at the Fergana Cotton-Lucerne Experiment Station of the NIHI Union. Simultaneously investigations have been conducted with hard non-branched wheats. The plan of work for 1949 is outlined.—R.P.J.

106 НАВОЛОЦКИЙ, А. В. Сорта яровой пшеницы для Псковской области. *Селек. Семеновод.* 1949. *No.* 5. стр. 74.

NAVOLOCKIĬ, A. V. [**Varieties of spring wheat for the Pskov province.**] *Selek. Semenovod.* 1949. No. 5. 74.

In the Pskov province the variety Lutescens 62 has surpassed the unselected sowings and the other regional varieties of spring wheat. New varieties of good quality and even higher yielding than Lutescens 62 have been bred for the province. Data from the State varietal trials in the province for 1940, 1945 and 1946 have shown that four varieties of spring wheat, Pamjatj Urala, Tulun 70 U/8, Diamond and Fulgia, possess considerable advantages in comparison with Lutescens 62 not only in yielding capacity but also in respect to other characteristics of economic value.

In Lutescens 62 lodging of the crop occurs during ripening, in some instances to such an extent as to render mechanized harvesting impossible. The four varieties mentioned above have straw resistant to lodging and are more resistant to attack by diseases and pests than Lutescens 62.

According to the results of the Government varietal trials in the province, preference should be given to Pamjatj Urala which in tests for 3 years surpassed Lutescens 62 in grain yield by 1.1 centners per ha. It is superior to Diamond and Fulgia in baking qualities. It has a white, awnless ear and red grain of good quality which is characterized by a longer period of after-harvest ripening than all the varieties mentioned. The grain is considerably less liable to sprouting in the field and at the same time possesses good baking qualities.—R.P.J.

107 ОБУХОВ, Б. С. Ветвистая пшеница "бес-бас-бидай". *Селек. Семеновод.* 1949. *No.* 5. стр. 75-6.

OBUHOV, V. S. [**Branched wheat "Bes-bas-bidaĭ.**] *Selek. Semenovod.* 1949. No. 5. 75-6.

Branched wheat, called by the local collective farmers "Bes-bas-bidaĭ" (five-headed wheat) occurred in the Kounrad district, Karaganda province, Kazah SSR. Ears of this wheat had been found long since in sowings of the old local variety Ak-bidaĭ.

The ear of Bes-bas-bidaĭ is very thick and broad. It attains a length of 15 cm. and more; the number of branches of the ear on both sides amounts to 20 and more: each branch is 2 to 3 cm. long, and contains from five to twelve grains. The number of grains in the whole ear is from 175 to 200. Individual ears contained 223 grains. Absolute weight of 1000 grains is 60 grm., the yield of grain from one ear amounts to 8 to 10 grm. The stem of branched wheat is very thick and strong, attaining a height of 1.2 metres and more.

In 1948 ears of branched wheat were selected from sowings of Ak-bidaĭ, and from them 4 kg. of seed were obtained. In sowings of wheat of the old local variety Kože-bidaĭ, one branched plant was found: when the ears were threshed 700 grains were obtained. The Karaganda Regional Board of Agriculture has elaborated measures for the study and propagation of branched wheat in the province as a whole.—R.P.J.

108 ШЕСТАКОВ, В. Е. Озимая пшеница Шмитовка 276. (Предварительное сообщение) *Селек. Семеновод.* 1949. *No.* 6. 67-8.

Šestakov, V. E. [**Winter wheat Šmitovka 276** (**Preliminary communication**)] *Selek. Semenovod.* 1949. No. 6. 67-8. [Petrov State Breed. Sta.]

The Petrov State Breeding Station by individual selection from the local wheat has bred a variety, Šmitovka 276. In years with severe winters (1936, 1939) Šmitovka 276 was outstanding in its ressistance to frost.

In the winter of 1942 at the Novo-Sibersk Station in a varietal trial all the varieties perished with the exception of Šmitovka 276. In 1943 at the Karabalyk Station this variety gave a yield exceeding by 11 to 28 per cent the yields of the winter-hardy varieties Lutescens 329, Ferrugineum 1239, Kuznečanka and Elovka. In 1944 at the Novo-Sibersk Station the winter-hardy varieties Lutescens 329, Uljanovka and " local Ojašinckaja 2114" showed 65 to 75 per cent overwintering, Šmitovka 276,98 per cent. The latter gave a yield of 17.45 centners per ha., surpassing the check variety Lutescens 329 by 2.95 centners per ha. (20 per cent). Šmitovka 276 has fine grain with excellent baking qualities, and in virtue of its good winter hardiness should be subjected to extensive study in Siberia and in regions in the south-east where the winters are severe.—R.P.J.

109 РЫЖЕЙ, И. П. Ветвистая озимая мягкая пшеница. (Предварительное сообщение) *Селек. Семеновод.* 1949. *No.* 6. стр. 68-9.

Ryžeĭ, I. P. [**Branched soft winter wheat** (**Preliminary communication**)] *Selek. Semenovod.* 1949. No. 6. 68-9. [Kirghiz State Plant Breeding Station]

The yield of the best varieties of winter wheat grown on the collective and State farms does not exceed 40 to 50 centners per ha. To obtain high yields of grain of the order of 100 centners per ha. it is necessary to produce plants of a new type with high productivity of the ear and short, tough straw. It is possible to breed high yielding forms of winter wheat by increasing the number of grains in the spikelet, and also to obtain the branched winter variety from ordinary soft winter wheat.—R.P.J.

110 Åkerman, Å., and MacKey, J. Försök till stegrande av vårvetets avkastning. II. Korsningar mellan vår- och höstvete. Beskrivning av Svalöfs Ellåvårvete. [**Attempts to improve the yield of spring wheat. II. Crosses between spring and winter wheat. Description of Svalöf Ella Spring Wheat.**] *Sverig. Utsädesfören. Tidskr.* 1949. **19.** 105-17. [English summary, 115-6.]

See *Plant Breeding Abstracts*

111 Flandrin. L'origine généalogique de nos blés. [**Geneaological origin of our wheats.**] *C. R. Acad. Agric. France* 1948. **34.** 977-81.

The publication of the comprehensive treatise on wheats by Flandrin includes a table of some 600 varieties and has aroused considerable interest. The author has made a detailed comparison of characteristics thus giving an idea of probable behaviour of hybrids. Almost all the French hybrids are derived from the two wheats Noé and the Scotch variety Shireff Squarehead. The first of these has been known under the names of Blé de l'Ile de Noé, Blé Bleu, Blé Défiance. Characteristics have been repeated in a large number of hybrids, (early ripening, large and full grain, white and smooth ear, straw half-full, very smooth leaves, liability to rust and smut, but resistance to lodging). The later-ripening Squarehead possesses contrasting characters. The ear is compact and bulky, grain is white and of medium size, straw strong and rigid. Reference is also made to the Italian wheat Riéti, noted for its earliness, resistance to rust and for its well-formed grain, but the wheat is liable to lodge easily. For this reason it is less adaptable to French cultivation, but presents certain characteristics which make the variety useful when seeking to obtain hybrids destined for southern regions. A full list of hybrids obtained from all three wheats is given.—M.L.Y.

112 Todaro, F. Miracolismo granario. [**Miracle wheat.**] *Humus, Milan.* 1949. **5.** No. 9. 14-5.

The author refers to reports of the Agricultural Academy of France according to which the Miracle wheat or Egyptian wheat (with branched ears) is not a recent discovery but has been known since ancient times. Often its cultivation was attempted but invariably it proved unsatisfactory (this wheat is not resistant to frost, and has a longer vegetative period than the usual varieties). It belongs to *Triticum compactum* and is derived from *T. turgidum* by mutation. It is found occasionally in Europe as a residual cultivation or as a weed. [See also *Fld Crop Abstr.* 2, Abs. 207].—E.B.

113 Obrelli, A. Grani di montagna. [**Wheat varieties for the mountains.**] *G. Agric. Domen.* 1949. **59.** 311.

The Agricultural Experiment Station of S. Michele in the province of Trento is supervising the production of pure seed of the varieties "Inallettabile 3", "Inallettabile 8", and "Razza Trento." The 1949 production will be used entirely for multiplication. It is thought that in 1950 it will be possible to meet all demands for cultivation both on the Alps and the Apennines.—E.B.

114 Gosi, L. Quale grano scegliere? [**Which wheat variety to choose?**] *G. Agric. Domen.* 1949. **59.** 309.

The principal wheat varieties at present cultivated and suitable to the varied Italian environment are reviewed.—E.B.

115 Thomas, I. and Watson, E. R. **Wheat variety trials.** *J. Dep. Agric. W. Aust.* 1949. **26.** 1-8.

Results are presented of annual trials conducted to determine varieties which can be recommended for West Australian conditions. The two standard recommended varieties are Bencubbin and Bungulla and both are used for comparison in all wheat variety trials of research stations.

A number of Eastern States varieties were included which have been introduced in recent years: (1) Celebration, from New South Wales Department of Agriculture is highly resistant to flag and stem rust; grain quality is good but yield only average under Western Australian conditions. (2) Frisco, also from New South Wales is early mid-season, its rust resistance being derived from Eureka; grain is of good quality and yields are very good. (3) Gabo (Sydney University) is highly resistant to all Australian rusts but susceptible to flag smut. It is especially suitable to higher rainfall areas. (4) Kendee (Sydney University) has the Kenya C 6042 type of rust resistance and also resistance to all known races of stem rust in Australia. Yields have been good, especially under higher rainfall conditions. (5) Yalta (N.S.W. Dep. Agric.) has resistance similar to Kendee. It is highly resistant but not immune from flag smut. It will probably replace Eureka as a mid-season variety. (6) Wongoondy is from Eureka × Bungulla; it is a promising variety favoured for its prolificacy, grain quality, straw strength and earliness. (7) Dowerin, from Sword × Kenya C.6041, has yielded extremely well, particularly in the high rainfall areas. It is resistant to all known races of stem rust in Australia and is the only registered released variety deriving its resistance from this particular Kenya parent.

The following varieties are recommended: Mid-season: Bencubbin and Kondut; the latter yields less than Bencubbin but is strong strawed and does well on ploughed-up clover land. It is not rust resistant but yields better than Bencubbin under epidemic conditions. Early Maturing: Dowerin and Wongoondy. Very Early Maturing: Bungulla suffers very little from rust damage because of its earliness. It does well in lower rainfall areas where climatic conditions are unfavourable. It is used extensively on ploughed pasture land. Koorda has done well on light soils, its strong straw being of great value. It is rust resistant in all but the heaviest epidemics and is almost immune from flag smut.—P.M.

116 Thomas, I. **New cereal varieties in Australia.** *J. Dep. Agric. W. Aust.* 1949. **26.** 35.

Brief notes are given on three new wheat varieties submitted for registration in 1948. Glenwari, a mid-season variety, derived from Nabawa × (Riverina × Hope), possesses straw of medium height. It is resistant to leaf rust race 34, and its biotype of stem rust and flag smut. Baking quality is good and yields are average. Wongoondy, from Eureka × Bungulla is an early variety, producing under good conditions almost premium quality grain. Straw is strong and the variety has strong resistance to flag smut and race 34 stem rust, but is susceptible to the biotype. Dowerin was derived from Sword and Kenya. Being a mid-season to early variety, the fine straw is weak under certain conditions. It has good resistance to race 34 stem rust and its biotype, as well as to flag smut and powdery mildew. Favourable yields have been reported.—P.M.

Seeds

117 Villamizar A., F. Clasificación del trigo para semillas. [**Classification of wheat for sowing.**] *Agric. trop.* 1949. **5.** No. 1. 11-3. [Centr. Office of Experiment and Research, Minagricultura, Colombia]

The following standard of marking wheat for sowing is proposed:

Uniformity	15	100
Extraneous matter	20	
Soundness and vigour	35	
Hectolitre weight	20	
Hardness	10	

The characters enumerated are discussed.—G.M.R.

Diseases and Pests

118 Grasso, V. La lotta contro le carie del grano con composti di rame e di mercurio in rapporto alla loro influenza sul potere germinativo delle cariossidi. [**Control of bunt of wheat with copper and mercury compounds in relation to their influence on the germinating power of the grains.**] *Ann. Sper. agr.* 1949. **3.** n.s. Special number. 451-88. [English summary pp. 485-6.]

Disinfection of wheat seed threshed both by machine and by hand was investigated. Results of laboratory trials were as follows: (a) machine-threshed seeds treated with compounds based on copper had a low percentage of germination and developed plants with poor roots; damage was higher with copper sulphate and lower with oxychlorides and other compounds containing copper in a less active form; (b) damage was smaller with grains treated with the same compounds but hand-threshed (thus the injuries to the seed integument, through which the fungicides damage the embryo, are avoided); (c) treatment with organic compounds based on mercury caused very little damage both in machine and hand-threshed seeds. In field trials of bunt control, from which only partial results were obtained, copper oxychloride proved highly effective, while the organic compounds of mercury gave poor results on the whole. Employing infected seed on plots containing *Tilletia*, the percentage of infection was higher than on sound plots (this is a further proof that repeated wheat cultivations are to be avoided). On sound plots and with sound seed no infection occurred. The hard wheat "Cappelli" proved highly resistant, while other varieties were more susceptible. While research is continuing, the author, as a preliminary conclusion, advises disinfection of the seeds with copper oxychloride. An extensive bibliography completes the article.—E.B.

119 Tonini, G. La peronospora del grano. [**Peronospora of wheat.**] *G. Agric. Domen.* 1949. **59.** 247.

The author describes an infection caused by *Sclerospora macrospora*, which is quite unusual in the area concerned. It developed during spring in wheat fields in the Emilia region, and followed river flooding of the previous November. It is known that floodings are indispensable for this disease to develop. In this case the soil was covered with water only for 1 or 2 days and the infection corresponded exactly to the flooded area. It is the opinion of the author that the oospores were carried by the Senio river, as its water collects in boggy zones of the Apennines where *Phragmites* grows. This is a gramineous plant commonly attacked by *Sclerospora*. Of the local wheat varieties, the "Mentana" has proved the most resistant, followed by "Tevere" and "Impeto."—E.B.

OATS

Agronomy

120 ТИМОФЕЕВ, Д. Т. Влияние сроков сева на наследственные изменения урожайных качеств семян овса. *Селек. Семеновод.* 1949. *No.* 2. стр. 67-70.

Timofeev, D. T. [**Influence of sowing dates on hereditary changes of yielding qualities of oat grain.**] *Selek. Semenovod.* 1949. No. 2. 67-70. [Kineljsk State Select. Sta.]

Early sowing of oats in south-east USSR improves the hereditary yielding qualities of seed of the progeny. High yielding qualities of seed obtained from spring sowing are preserved also in subsequent generations. Systematic breeding in conditions of late sowing progressively impairs the yielding qualities of the seed of the progeny. Mičurin's view that every plant has the capacity to modify its structure, adapting itself to new surroundings in the early stages of its existence and that this capacity begins to be shown in large measure from the first days after emergence of the seedling from the seed, applies also to annual self-fertilizing cereal plants. The causes of hereditary changes in yielding qualities under the influence of dates of sowing appear to be changes in the relation of the elements of temperature and light with the elements of soil moisture and concentration of soil solution in the spring sowing period. In the early period of spring sowing this variability appears in a higher degree and at a more rapid rate than in the late dates of spring sowing. This is confirmed by the wide amplitude of fluctuations of yield of seeds in the progeny of plants resulting from an early date of sowing, and conversely by the more uniform yield of the progeny of those plants raised after a late sowing date. The yield of any sowing of self-fertilized cereal crop depends on external conditions in the given year in which growth and development of the sowing proceeds, and on the hereditary basis of the seed, laid down in the early period of development of the parent plants in the preceding year. This confirms the fact that plants grown with early dates of sowing give a high yield in the progeny even if the parent plants with early dates of sowing gave a lower yield than in late sowing.—R.P.J.

Varieties

121 Caffrey, M. **Oat breeding at the Albert Agricultural College 1907-1947.** *J. Dep. Agric. Éire.* 1948. **45.** 29-37. [Plant Breeding Dept., Univ. Coll., Dublin]

An account is given of the investigations leading up to the production of Victory, Victory 2, Glasnevin Sonas, Glasnevin Success, Glasnevin Ardri, Glasnevin Triumph and Potato oats, and the methods employed in the production and distribution of these and other varieties are briefly described.—Author's summary.

122 Down, E. E. **Two new varieties of oats for Michigan.** *Quart. Bull. Mich. agric. Exp. Sta.* 1949. **31.** 263-5.

In 1948, as a result of hybridization by the Farm Crops Department of Michigan State College and the Office of Oat Investigations of the U.S.D.A., between Bond and D69, two new oat varieties, Kent and Bonham, appeared, both bearing a rust resistance similar to Clinton. Kent is a high yielding, early maturing, white-grained variety, with medium straw length and high test weight. It is especially recommended for the Saginaw Valley, being planted after sugar beet or corn. It should replace Huron but not the Eaton variety.

Bonham is a high yielding, early maturing, smut and rust resistant, reddish-yellow-grained variety of medium straw length and of high test weight. It is recommended for the Upper Peninsula and regions where similar conditions prevail. Both Kent and Bonham are resistant to the new root-rot disease (*Helminthosporium victoriae*).—E.B.H.

Seeds

123 БОРИСЕНКО, С. И. Сухое протравливание овса. *Совет. Агрон.* 1949. *No.* 3. стр. 83-4.

BORISENKO, S. I. [**Dry disinfection of oats.**] *Sovet. Agron.* 1949. No. 3. 83-4.

Granozan (a preparation consisting of 98 per cent talcum and 2 per cent ethyl mercurous chloride) applied as a dry disinfectant at the rate of 2 to 3 kg. per ton of seed is highly effective in the control of *Ustilago avenae* and *U. levis* of oats. The preparation has a stimulating effect on germination of the grain.

Dry treatment of oats to combat fungi is more convenient, simpler and more reliable than disinfection with formalin. It precludes subsequent infection of the seed, which may occur after treatment with formalin.—R.P.J.

Fertilizers

124 DUNN, T. C., SMITH, S. T., and CARISS, H. G. **Responses of oats to zinc, phosphate and copper on newly cleared light land in Western Australia.** *J. Dep. Agric. W. Aust.* 1949. **26.** 75-82.

In the past large areas newly cleared and under normal cultivation and manuring, do not become sufficiently productive of pasture or cereal crops for some years after the clearing. These poor returns have seriously hampered development of some of these areas which lie in zones of satisfactory rainfall. Experiments have been carried out to improve with fertilizers the growth and yield of oats on such land. Four widely separated sites were used for the trials.

The inclusion of zinc in the fertilizer treatment produced very marked results in grain yield and vegetative growth. When zinc was not included, a bronze tipping developed on the leaves, which gradually became darker and extended down the leaves until the outer leaves were dark grey to black in colour, when they died. Leaves which emerged later developed the same symptoms.

As well as zinc, a higher rate of superphosphate produced increased growth and yields, and at one centre, copper gave equally good results. It is recommended that on all newly cleared land, zinc fertilizer should be used with not less than 1 cwt. per acre of superphosphate.—P.M.

BARLEY

Varieties

125 ATKINS, R. E., and BURNETT, L. C. **Moore barley.** *Farm Sci.* 1949. **3.** 7. [Iowa State Coll., Ames]

Moore barley is a selection from the cross of Wisconsin 38, Chevron and Olli made by Shands of Wisconsin. It is a six-rowed, smooth-awned variety of medium height and late maturity, and has stiffer straw than Iowa varieties. Moore appears to be a definite improvement over the malting varieties now grown in Iowa; it outyielded them in 3 years' tests, 1946-48. It is moderately resistant to stem rust, mildew and spot blotch but is susceptible to leaf rust, stripe, loose smut and scab.—K.J.S.

126 PLATT, A. W., and WELLS, S. A. **Shattering, breaking and threshability in barley varieties.** *Sci. Agric.* 1949. **29.** 453-64.

Damage to barley varieties, at and following maturity, by wind and rain was studied. Shattering and neck breaking were noted in a series of varieties for 5 years when grown on dryland and for 3 years on irrigated land. Data on stem breaking were obtained in one test. Buckling was noted on certain varieties. In addition, the threshability of the varieties in two tests was recorded.

Highly significant varietal differences were established in all tests for all of the characters studied. These differences were large enough to be of economic significance. The variety Glacier was highly resistant to all types of damage, while the Manchurian types tended to be highly susceptible. In most tests shattering and neck breaking were positively associated. Neck breaking and stem breaking, and shattering and threshability were also positively associated.—Authors' summary.

RYE

Seeds

127 FREITAS, A. P. do C. e A esterilidade do centeio e as suas relações com o comprimento da espiga e com o volume e pêso dos cariopses. [**The sterility of *Secale cereale* L. and its relation to the size of the ear and the volume and weight of the caryopses.**] *Agron. lusit.* 1946. **8.** 165-203. [English summary, 199-200.] [Received 1949] [Est. Agron. Nac., Sacavem, Portugal]

The present work deals with the effects of sterility on the yield of rye and its bearings on the weight, volume and density of the grains and on the productivity of the ear. Observations were made of three samples of a cultivated rye from different places, comprising a total of 2066 ears. Variations in ear length in relation to the above-named characters were observed as well as the percentage of ears in each class of ear length, and fertility indices were recorded. Within each class of fertility index, the variation in number of ears for each ear length was also recorded. The material was divided into five ear-length classes, from 2 cm. to 17 cm., and each class was further divided into seven fertility index classes ranging from 0 per cent to 100 per cent. It was found that larger ears had larger and heavier grains, a higher yield and more grains per ear, and a higher fertility index. On the other hand, ears with a higher fertility index bore smaller and lighter grains but a higher yield per ear. In breeding rye for productivity, only large ears with a maximal number of grains should be used. Selection of the largest grains might bring about an increase of sterility.—From author's summary.

Diseases and Pests

128 Brande, J. van den, and Damme, J. van. Bestrijding van het roggeaaltje (*Ditylenchus dipsaci* Kühn). [**Control of the rye stem eelworm, *Ditylenchus dipsaci* Kühn.**] *Med. LandbHogesch. Gent* 1949. **14.** 135-44. [French, English and German summaries, 141.] [Dept. Zoology, Agric. Coll. Ghent, Belgium]

DD mixture was applied at the rate of 2, 3, 4 and 6 litres per are at a depth of 12 and 20 cm. Yield on the control plot was equivalent to 911 kg. per hectare. From the 2-litre per are dose applied at a depth of 12 cm. 2640 kg. per ha. were obtained and applied at 20 cm., 2800 kg. per ha. From the highest dose applied at 12 cm., 3651.5 kg. per ha. were obtained and, applied at 20 cm., 4022.1 kg. per ha. The product is too expensive to justify the use of the higher concentration, but the 2 litre per are rate is economic and the depth of 20 cm. is recommended.—From authors' summary.

MAIZE

Varieties

129 Alabouvette, and Ratou. Sur les possibilités d'utilisation en France de certains hybrides Américains de maïs. [**On the possibilities of using certain American maize hybrids in France.**] *C. R. Acad. Agric. France* 1949. **35.** 219-22.

During 1947 experiments commenced with a small collection of hybrids from Canada, and were followed by more extensive tests with Wisconsin Ruthin American hybrids from 1948 onwards. In every case, the Wisconsin hybrids behaved more uniformly than the existing French maize varieties, and were more resistant to lodging and in most cases also to smut. Only the variety Wisconsin 1600 was liable to lodging. Comparative results obtained in the dry 1947 season and the unusually cool, wet summer of 1948 provided some interesting data. For example, Wisconsin 355 which was very productive in 1947, was surpassed in the following year by a number of late maturing varieties. Growth cycles of the various American hybrids are given in tabular form and compared with French varieties. Effect of environment is evident. These preliminary experiments will be followed by further study of the most suitable variety for each particular locality. The possibility of producing seed from these hybrids is now being carefully studied and self-pollinated strains are being distributed to various stations in Europe concerned with maize selection.—m.l.y.

130 Cauderon, A. Le problème des variétés et la culture du maïs-grain au nord de la Loire. [**The problem of varieties and the cultivation of seed maize, north of the Loire.**] *C. R. Acad. Agric. France* 1949. **35.** 230-3.

The introduction of maize hybrids from North America will make it possible to extend cultivation in northern France. A study of the behaviour of these hybrids is being made at the Station Centrale d'Amélioration des Plantes at Versailles, where attention is also being given to the adaptability of European varieties such as maïs d'Alsace ; maïs de Bresse, Bade, Pfarrkirchner, Chiemgauer and Mecklenburger (German varieties) ; Vroege Gele Ronde, Baanbrecker and Unicum (Dutch varieties). The new French variety Etoile de Normandie can also be classified with this " Flint " group. All these varieties have common characteristics : moderate height, erect, narrow ear. Results obtained at Versailles during the exceptionally cold season of 1948 (sowings made 21st May, cropped 30th October) show that Wisconsin 255 gave 5 per cent higher yield than Etoile de Normandie. The short growth cycle (85 days) will, however, limit the cultivation of this hybrid to the Paris region. Sowing early in May should give a good yield early in October provided conditions are favourable.

Results obtained in Bresse and in the Jura have confirmed records at Versailles as to the superiority of the American hybrids and multiplication of these strains is projected during 1949. The first cultural tests will be made with varieties : Unicum, Baanbrecker, Vroege Gele Ronde, Etoile de Normandie, Canbred 150 (Canada), Nodak 203, Nodak 301, Wisconsin 240 and Wisconsin 255.—m.l.y.

131 Schad, C., and Michel, D. L'amélioration du maïs en Limagne. [**The improvement of maize in Limagne.**] *C. R. Acad. Agric. France* 1949. **35.** 225-8.

Since 1945, cultivation of maize has been given a trial for the first time at Clermont-Ferrand (altitude 330 metres). Comparative tests are in progress to determine the most suitable varieties, combining high yield with good ripening quality, but at the same time limiting growth cycle to the frost-free period (i.e. 1st May to 15th October.) The mean temperature 1945-48 from May to September in this area is given as 17.7C., with average rainfall 266 mm.

Amongst the varieties so far tested, the early Etoile de Normandie appears to be the most promising. Usual growth cycle is 85 days, but 113-130 days is required at higher altitude ; yield 30-49 quintals per hectare cropped between mid-September and mid-October. This compares favourably with the later variety Grand Roux Basque which requires 155-165 days although the latter shows a higher yield. Yields from American hybrids showed on the average a higher yield than the French varieties but a longer growth cycle, 140-160 days—M.L.Y.

132 Méneret, G. Essais de maïs hybrides américains en Bresse. [**Hybrid maize tests in Bresse.**] *C. R. Acad. Agric. France* 1949. **35.** 222-5.

Experiments carried out in 1948 in Côte-d'Or, Jura and Ain have made it possible to determine the American hybrids most suitable to Bresse conditions. Those belonging to the 80-85 days' cycle (U.S. rotation) include the two varieties Wisconsin 255 and Wisconsin 240 which are giving promising results, especially as regards high yield, compared with French varieties.—M.L.Y.

133 КОЗУБЕНКО, В. Е. Гибриды кукурузы в Черновицкой области. *Селек. Семеновод.* 1949. *No.* 6. стр. 70-1.

Kozubenko, V. E. [**Hybrid maize in the Černovic province**] *Selek. Semenovod.* 1949. No. 6. 70-1. [Černovic Agric. Res. Sta.]

In sowings in the Černovic province maize occupies first place according to area, but the local varieties are not high yielding. Breeding at the Černovic Agricultural Research Station has resulted in the production of hybrids which surpass the local varieties in yield. Besides crossing of local maize with dent varieties the Station is engaged in the production of other inter-varietal hybrids. In such a way the hybrid Bukovinsk No. 1 was obtained from crossing the dent variety Kuban 3135 with the flint early ripening variety Voronež 76. This hybrid ripens 2 to 3 days earlier than the local variety Bessarabka and is considerably higher yielding than both local maize and Minnestoa 23. The hybrid Voronež 76 × Kuban 3135 ripened 2 to 3 days earlier than local maize and yielded on the average 9.5 centners per ha. more than the latter. In 1949 it is planned to sow this hybrid on an area of about 200 ha. on collective farms in the vicinity of the Station.—R.P.J.

134 СТАРКОВ, А. А. Кукуруза "Гибрид Донской" *Селек. Семеновод.* 1949. *No.* 5. стр. 60-2.

Starkov, A. A. [**"Hybrid Donskoĭ" maize.**] *Selek. Semenovod.* 1949. No. 5. 60-2.

" Hybrid Donskoĭ" originated from a cross between Belaja Zubovidnaja Kharkov and Voronež 76 made at the Experiment Station of the Azov-Black Sea Institute of Agriculture in 1944. The hybrid is a medium-early form, ripening generally at the same time as Belaja Zubovidnaja Kharkov or 1 to 2 days earlier. The plant is of medium height, and suitable for mechanized harvesting. The hybrid usually produces variegated grain, but the predominant colour is white. The yield of grain is high, approximately the same as in Belaja Zubovidnaja Kharkov. It is very drought resistant : it tolerated the unfavourable dry conditions of 1946 and also of 1948 (for late cultivations) better than all other varieties and hybrids and gave excellent yields (20 to 28 centners per ha.).

In 1945, which was more favourable in the Rostov province for maize, Hybrid Donskoĭ gave the highest yield of all the collection of varieties. High and uniform yields were obtained not only in the northern but also in the southern areas of the province. The hybrid Uspeh is inferior to Hybrid Donskoĭ in yield and is later ripening.—R.P.J.

135 Illinois Agricultural Experiment Station Bull. 531. **1948 Illinois tests of corn hybrids in widest use.** By *J. W. Pendleton et al.* 1949. pp. 32.

A report is given of trials of corn hybrids carried out at six stations in different parts of Illinois. The tests were carried out in six replicated trials from which estimations were made of total yield per acre, oil, protein and moisture content, percentage of damaged corn and of resistance to corn rootworm—expressed as a percentage of plants showing lodging. Notes of the relative heights of the ears were also taken.

The average yield of the hybrids investigated was more than 50 per cent greater than the State average for the season. Highly significant differences between the yields of different hybrids were observed. No correlation was found between yield and protein or oil content. There was little damage from European corn borer. Lodging was of importance at only two of the experimental stations. Some damage was caused by corn rootstalk rots, in particular *Diplodia zeae* and *Gibberella zeae.*

A report is also given of the results of a series of trials made over a period of 3 years with three single cross and six double cross hybrids demonstrating the great difference between the yield obtained on high and on medium productive soil.—F.G.H.L.

136 OSORIO, C. B. Importancia de la selección de la semilla de maíz. [**Importance of selecting maize for sowing.**] *Agric. venez.* 1948. **13.** No. 132. 31.

Farmers should select maize seed from vigorous plants having at least two large, sound cobs per stem, and strong, not too tall stems. The plants must, in addition, be uniform in ripening and productivity and be resistant to disease and insect pests. Seed should be taken from the middle of the cob only.—G.M.R.

Seeds

137 SHEDD, C. K. **Progress in methods of drying corn.** *Agric. Engng St. Joseph, Mich.* 1949. **30.** 131-3.

Increased use of hybrid seed and the fact that high-yielding hybrids require a long growing season, suggest the probable spoilage of dried maize if storage is delayed. Farmers in U.S.A. can therefore no longer rely on the old crib storage methods. Drying with unheated air has been practised successfully over a period of several years in Ohio (which is noted for high atmospheric humidity). In this connexion observations of loss of moisture in bins were made at Ames, Iowa, comparing rates under four different conditions. The advantage in shelling the corn before drying is emphasized; a saving of about 40 per cent in amount of moisture to be evaporated is thus effected and there is evident resistance to air flow as compared with unshelled maize. Shelled maize is adapted to continuous-flow drying, preferably using the counterflow principle, which has only recently been tried out in Iowa. Reference is made to improvements which might be made to the portable drier.—M.L.Y.

138 MEULEN, E. V., and HENKE, F. **Cold testing of seed corn.** *Seed World.* 1948. **63.** 8-10.

The authors describe this method developed a few years ago at Iowa State College. Specimens of treated and untreated seed are first planted in a soil medium of two-thirds sand and one-third *Pythium* infested soil; then they are placed in the cold chamber at a controlled temperature of 45°F. for 7 days. The conditions here are comparable to cold rainy weather, and the seeds do not germinate but swell a little owing to moisture absorbtion. The seeds are then placed in the germinator for 6 to 8 days at alternating temperatures, 16 hours at 68°F. and 8 hours at 86°F. Only those seedlings of a strong and healthy appearance are classified as normal.

Cold tests are concerned mainly with the diseases *Pythium* and *Gibberella*, and results showed that the non-treated corn when subjected to cold and wet conditions immediately after planting was attacked by disease, and maximum germination and growth were prevented. Fungicide-treated corn was most successful in resisting disease, and germinated and grew well. These tests determine the efficiency of fungicides for seed protection and indicate to corn breeders the inherent vigour and disease resistance of their breeding stock. They help determine the existing vigour of carry-over corn a year or more old and also reveal the importance of careful methods of seed production, handling processing and storage.—E.B.H.

Diseases and Pests

139 REITSMA, J., and KARTHAUS, J. P. Onderzoek naar de resistentie van verschillende maisvariëteiten tegen omo lijer of bulai (*Sclerospora maydis* Palm.) [**The resistance of different maize varieties to *Sclerospora maydis*.**] *Landbouw, Buitenzorg* 1949. **21.** 427-44. [English summary 442-4.] [Inst. Plant Diseases and Pests, Gen. Agric. Res. Sta., Buitenzorg, Java]

An account of trials of indigenous and imported maize varieties from 1935 to 1938 indicates the existence of varietal differences in resistance to *Sclerospora maydis*. The technique of inoculation employed (contact infection) is described.—From authors' summary.

140 ILLINOIS Extension Service in Agriculture and Home Economics. Circ. 637. **Corn borer control in field corn.** 1949. pp. 16.

In 1947 the European corn borer, *Pyrausta nubilalis*, caused damage estimated at 31 million dollars to the corn crop in Illinois. Three methods of control are available: (1) proper disposal of corn stalks after harvest; (2) planting at the proper time; (3) use of adapted hybrids. Two strains of corn borer occur in Illinois, one with two generations per year and the other with only one. The former is of the greater importance. Its first generation lays its eggs in June on the tallest corn plants available. Eggs laid on short plants have a low survival rate. The second generation lays its eggs in July and August on the most succulent plants available. It is therefore necessary to grow corn so as to avoid having plants suitable for either generation. The planting period is May 15 to 25. On soil of low fertility there is no need to delay planting to evade attack as borers are not attracted to crops on such soils. If the soil is heavily fertilized it is important to plant at the right time.

Some varieties of corn are unattractive to the borer, some present a mechanical barrier through which the larva cannot penetrate, and some are but little damaged by the attack.

The borer spends the winter months in the stems of infected plants. The best method of control is therefore to plough in all stems to at least 14 in. before the middle of May. Experiment has shown less than 2 per cent survival after such treatment. Machines for cutting up the straw before ploughing have proved useful. Burning the straw is ineffective and wasteful. Successful control has been obtained from such insecticides as DDT and Ryania. Control by insect parasites is not likely to be effective. —F.G.H.L.

141 UNITED STATES, Department of Agriculture. **Laboratory tests of toxicity of some organic compounds to the European corn borer, 1940 to 1948**. By *D. D. Questel* and *S. I. Gertler*. 1949. pp. 11.
Control of *Pyrausta nubilalis*.

142 MINNESOTA Agricultural Extension Service. Ext. Bull. 257. **Fighting the European corn borer in Minnesota.** By *H. E. Milliron* and *A. W. Buzicky*. 1948. pp. 12.

SORGHUM

Agronomy

143 WORLD CROPS. **Sorghum in Queensland.** *World Crops* 1949. **1.** 28-31.
This comprises an account of the British Overseas Food Corporation's project, by which it is hoped to increase the amount of feed available for live stock for Britain's future meat supplies. Sorghum grain will be produced both for feeding to pigs in Queensland and also for direct export to Britain for the same purpose. The area was surveyed in January 1948 and it was suggested that at least 20,000 acres could be cultivated for harvesting in May 1949. This would produce 10,000 tons of sorghum, and by May 1951, 160,000 acres would be under cultivation. Ultimately, some 250,000 pigs would be fed from 250,000 to 300,000 acres. To supply protein for the diet, lucerne is to be grown on irrigable and near to sorghum estates and on the coast.

Five properties totalling more than 350,000 acres have been purchased, all in Central Queensland. The soil is rich black loam, very fertile, flat, rolling and treeless, for many years previously overstocked with sheep. The territories are free from disease problems, have good communications and small, but quite good deep-water ports are available.

Ploughing began in May 1948, three large tractors pulling twelve disk ploughs, turning 90 ft. per journey. By October, 30,000 acres were almost ready for seeding. In Jan. 1949, the rains came and round-the-clock planting started. In 15 days, 30,000 acres were planted, sowing being done by twenty-seven tractors each pulling a 24 row drill. Grazing areas have so far been left in the hands of the original owners, but the Corporation intends to fatten cattle on these lands as well as on the sorghum stubble. Seven thousand cattle have already been purchased.—P.M.

Seeds

144 MARCHAL, A. Observations sur la couche brune des grains de sorgho. 1. La couche brune et les qualités alimentaires du grain de sorgho. [**Observations on the brown layer of sorghum grains. 1. The brown layer and the food qualities of sorghum grain.**] *Agron. trop.* 1949. **4.** 139-40.
As a result of observation on the sorghum varieties grown in the Niger colony, the author draws the conclusion that, at least in the regions considered, the presence of the brown layer in sorghum grain results in inferior food quality of the flour. This brown layer is called by some "nucellar layer" because it is reputed to be a vestige of the nucellus. —E.B.

145 RABECHAULT, H. Observations sur la couche brune des grains de sorgho. 2. Anatomie sommaire des enveloppes du grain de sorgho. [**Observations on the brown layer of sorghum grains. 2. Anatomy of the integuments of sorghum grain.**] *Agron. trop.* 1949. **4.** 141-50.
From the examination of ten African species of sorghum it is inferred that the cellular layer, which is placed between the pericarp and the aleurone layer, is not a vestige of the nucellus but is present in the seed also when it has no pigment, with the exception of a few cases in which it appears to be missing.—E.B.

RICE

Agronomy

146 GRIST, D. H. **Rice, staple food of half the world.** *World Crops* 1949. **1.** 5-8.
A review is given of the current world rice situation, with a brief outline of the methods of cultivation adopted in Asiatic countries. Some of the problems facing the International Emergency Food Commission are outlined and some suggestions are advanced for the improvement of yields, and extension of areas of cultivation.—P.M.

147 CHEVALIER, A. La culture du riz dans les pays tempérés. [**Rice cultivation in temperate countries.**] *Rev. Bot. appl.* 1949. **29.** 307-8.

148 Guillaume, —, Portères, R., Guilloteau— and Maistre, —. Le problème rizicole dans les territoires africains de l'Union française. [**The rice problem in the African territories of the French Union.**] *Agron. trop.* 1949. **4.** 339-78. [Sect. tech. Agric. trop. Nogent-s-Marne (Seine)].

The situation regarding rice cultivation is examined separately for Continental Africa (West and Equatorial French Africa, Togo and Cameroons) and for Madagascar. In the latter country rice is the basis of human food, while in the former it is a secondary food crop, following millet, sorghum and tuber plants. The subject is dealt with under the headings: statistics and distribution of crops (data are also given for sorghum and maize and two maps of the region show the areas under rice); cultural methods; organization and present situation of research (need of co-ordination among the experimental stations is stressed). The possibilities of development are examined and an account of programmes and of works carried out is given. It is thought that with the development of cultivation French West Africa will be able to export about 30,000 tons of rice and Madagascar about 40,000 tons annually.—E.B.

149 Toll, H. El arroz en las zonas salitrosas de Huesca y Lérida. [**Rice in the salty regions of Huesca and Lerida.**] *Ager, Madrid* 1949. **5.** No. 51, pp. 11-2.

With the industrial systems recently introduced in agriculture, rice cultivation has developed on waste and salty lands. With proper management it is possible to reduce the degree of soil salinity. The varieties more widely grown are Benlloch and Precoz Verde. Average yield is 3500 to 4000 kg. per ha. Size of land tenure varies from 200 ha. in the industrial concerns to a quarter of a hectare in the family-owned farm. The possibility of maintaining rice cultivation is discussed.—E.B.

Varieties

150 Portères, R. Les Guyanes, centre secondaire nouveau de variation des riz cultivés (*Oryza sativa* L.) [**The Guianas, new secondary centre of variation of cultivated rice**] *Agron. trop.* 1949. **4.** 379-404.

The author classifies, describes and illustrates the rice varieties collected by A. Vaillant (see *Fld Crop Abstr.* 2, Abs. 803, 1949) which all belong to *Oryza sativa*. He discusses the problem of rice introduction into the region and expresses doubt in regard to an African origin. An Asiatic origin is considered more likely and variations may have occurred locally.—E.B.

151 Noriega, G. Siembras experimentales de arroz de las variedades españolas "Sollana" y "Bomba" en Costa Rica. [**Trials of the Spanish rice varieties Sollana and Bomba in Costa Rica.**] *Rev. Agric. Costa Rica* 1949. **21.** 149-50.

A short account of a trial in the Costa Rican Province of Alajuela; altitude 830 m.; temperature 22 to 27°C.; soil clay; rainfall rather sparse; no irrigation. Sollana ripened earlier than Bomba and appears more likely to become acclimatized. Bomba was attacked by the larvae of *Melolontha vulgaris* and became for a large part diseased.—G.M.R.

Fertilizers

152 Germek, E., and Morais, M. V. de. A aplicação de adubos em sulcos laterais na cultura de arroz de sequeiro. [**The application of fertilizers in lateral furrows to rice.**] *Rev. Agric. Piracicaba* 1949. **24.** 151-6. [Inst. Agron., Piracicaba, São Paulo, Brazil]

At the Experiment Station of Mococa, Brazil, four fertilizers were applied to rice; (a) in the usual manner, namely, directly into the 60 cm. drills some 15 days before sowing the rice; and (b) in separate furrows running parallel with the rice drills. The fertilizers applied were ammonium sulphate at the rate of 389 kg. per ha., superphosphate at 381 kg. per ha., potassium chlorate at 83 kg. per ha. and cotton cake at 1333 kg. per ha. The following percentage differences in grain yield were determined in favour of procedure (b): ammonium sulphate, + 44 (significant); superphosphate,—7 (not significant); potassium chlorate, + 10 (not significant); cotton cake + 141 (significant). With the exception of the superphosphate, all the abovenamed fertilizers will probably give better results when applied in parallel drills.—G.M.R.

Weeds

153 Piacco, R. Fitormoni contro le erbacce. Prove in risaia. [**Plant hormones against weeds. Trials in the rice field.**] *G. Agric. Domen.* 1949. **59.** 225.

Transplanting has modified the facies of weed growth in the rice field, but weeding is still necessary; it is carried out three times and requires on the whole 50 and more working days per hectare from the end of May until the end of June/beginning of July. The principal weeds are *Alisma plantago, Alopecurus geniculatus, Scirpus mucronatus, S. maritimus, Heleocharis carniolica, Panicum crus-galli, P. phyllopogon, P. erectum.* Weeding is done by hand, and where rice is grown in rows, also by mechanical means. Cultural methods of control are also practised. Field trials with Agroxone (see *Fld Crop Abstr.* 2. Abs. 872, 1949) are being continued.

This herbicide is used in a concentration of 2 per cent in water, and two or three treatments are given during the first half of June with a total of 250 to 1000 litres per hectare. Advice is given regarding the possibility of replacing hand weeding by this method. The first hand weeding can be replaced if *Alisma plantago* is predominant over *Alopecurus geniculatus*. The second and third weeding can be replaced only if the total Cyperaceae amount to 60 per cent of the weeds. For control of *Panicum*, however, hand weeding must always follow the chemical treatment. It is concluded that this new herbicide is advisable only in certain conditions, viz. on fields flooded with water and in other cases in which the Cyperaceae are predominant.—E.B.

Diseases and Pests

154 Dijk, J. W. van. Enige gegevens over rivierwater met sterk magnesiahoudende verdampingsrest. [**Some information on river water with high magnesia content.**] *Landbouw, Buitenzorg.* 1949. **21.** 421-6. [English summary, 426.] [Inst. Soil Res., Gen. Agric. Res. Sta., Buitenzorg, Java]

There are some rivers in eastern Indonesia in which magnesia in solution dominates over lime. Studies of white tip disease of rice in Texas (A. L. Martin, *Amer. J. Bot.* 26. 846-52. 1939) suggest that the use of such water for irrigation would be injurious to rice cultures.—From author's summary.

LEGUMES

BEANS

Varieties

155 ДРОЗОВ, Н. А. Фасоль в Ленинградской области. *Селек. Семеновод.* 1949. *No.* 6. стр. 69-70.

Drozov, N. A. [**Phaseolus in the Leningrad Province.**] *Selek. Semenovod.* 1949. No. 6. 69-70.

Until recently it was thought that *Phaseolus* could be grown near Leningrad only as a horticultural crop. For the last 4 years the Crop Production Department of the Leningrad Institute of Agriculture has been working to obtain varieties suitable for growing on a field scale and to elaborate appropriate agricultural measures for their cultivation.

Experiments have been conducted in the garden of the Leningrad Institute of Agriculture in which forty-eight varieties of *Phaseolus* were grown for seed. The variety Ščedraja was used as standard. All the varieties ripened, seven giving a yield of air-dried grain exceeding 40 centners per ha., and eleven a yield exceeding 25 centners per ha. on well manured medium clay soil. In a seed production experiment conducted in 1947 in which ten varieties were included, the yield of six varieties ranged (in centners per ha.) from 47.9 to 41.2 and of three from 37.8 to 31.2 compared with 40.2 given by the control variety Ščedraja. To verify the experimental results, trial sowings of the variety Ščedraja were made during 1946 and 1947 on State farms in the Leningrad province, when high yields of grain were obtained (in 1946 a yield of 31 centners per ha. in the Volosov region and in 1947 a yield of 28 centners per ha. in the Pavlov region). In 1949 on the collective farms in the Leningrad province *Phaseolus* was sown on an area of 200 ha.—R.P.J.

156 БЛОХА, Л. М. Новые сорта фасоли. *Селек. Семеновод.* 1949. *No.* 7. стр. 76-7.

Bloha, L. M. [**New varieties of Phaseolus.**] *Selek. Semenovod.* 1949. No. 7. 76-7.

The Mironov State Plant Breeding Station is producing *élite* seed of grain-legume crops for the provinces of Kiev and Žitomir. The initial breeding material consisted of seed of local varieties collected in different regions of the Kiev province. This seed was sown in 1944, and in 1947 two numbers of *Phaseolus* were transferred to the State Varietal Trials under the names of Kiev 5 and Mironov 14.

Results of trials indicate that both varieties bred at the Mironov Station ripen 8 to 12 days earlier than the two standard varieties, Robjust ulučšennyj and Bomba belaja. Mironov 14 occupies first place for yielding capacity, surpassing the variety Bomba belaja by 3.77 centners per ha. and the variety Robjust ulučšennyj by 1.4 to 2.8 centners per ha.: it is, too, only slightly susceptible to bacteriosis.

The variety Kiev 5 on the average of 4 years surpassed Bomba belaja in yield by 2.13 centners per ha. or 24 per cent and gave a slightly lower yield than Robjust ulučšennyj. It is earlier ripening than both standard varieties and is more uniform in its yields. The seeds of this variety possess valuable commercial characteristics. In 1949 both varieties will be investigated on varietal plots in the provinces of Kiev and Vinnic.—R.P.J.

Diseases and Pests

157 Lange, W. H., Carlson, E. C., and Leach, L. D. **Wireworms in lima beans.** *Calif. Agric.* 1949. **3.** 5 and 10.

Seed treatment with purified gamma benzene hexachloride has proved successful in lima beans in laboratory and field tests. A measured dosage may be applied in an ordinary mixer and the seed may be sprayed with water if desired. Treatments include the spraying of liquids on the seed either as suspensions of wettable powders or as solutions; or thick suspensions may be applied in a slurry treater. Under ordinary conditions 4 oz. of 25 per cent gamma BHC (purified) to 100 lb. of seed is satisfactory, although this may cause some delay in emergence and retardation of growth. With the slurry treater 1.33 oz. of a 75 per cent high gamma BHC is equivalent. One seed treatment may give a 75 to 90 per cent kill of wireworm; the action is by contact when the wireworms approach the seed. Fungicides such as Arasan may be combined with the BHC.—K.J.S.

LUPIN

Seed

158 Rosborg, S. Gul sotlupin—ett utsadesproblem. [**Yellow sweet lupin—a seed grain problem.**] *Svensk Frötidn.* 1949. **18.** 130-1. [Swedish State Cent. Seed. Test. Sta.]

Samples of yellow sweet lupin analysed at the Swedish State Seed Testing Station have during the last few years shown an increasing content of bitter seeds, while the samples with low contents of bitter seeds are becoming fewer. The Seed Testing Station does not permit State sealing of sweet lupin with a higher content of bitter seeds than 5 per cent. While 91 per cent of the samples examined during the season 1945-46 met this requirement, of the samples analysed up to the present during this season only 12 per cent have come below the 5 per cent limit.

The average figure for the content of bitter seeds per sample has been as follows:

Season 1945-46	3 per cent.
1946-47	5 ,, ,,
1947-48	7 ,, ,,
1/7/1948—1/2/1949	12 ,, ,,

Individual samples this current season have contained more than 20 per cent bitter seeds. The State Seed Testing Station in Denmark, which since 1939 has conducted investigations concerning the bitter principle with a larger material than that available in Sweden has previously observed this tendency to degeneration.—R.P.J.

SOYBEANS

Agronomy

159 Nyasaland Agricultural Quarterly Journal. **Soya beans.** *Nyasaland agric. Quart. J.* 1948. **7.** 93-102.

A review of various publications, the most recent of which is Bull. No. 1217, Dept. Agric. S. Rhodesia, April, 1948.—K.O.

160 United States, Department of Agriculture. Tech. Bull. No. 966. **Soybeans in American farming.** By *E. G. Strand.* 1948. pp. 66.

Soybeans are produced mainly in the Corn Belt, the Mississippi Delta and the Atlantic Coast States. Dynamic changes in production, processing, marketing and the wartime price and demand relationship, together with the introduction of the labour-saving, cost-reducing combine-harvester have created a new awareness of the economic possibilities of soybeans. They can be grown in a wide climatic range, topography and soil erosion dangers being limiting factors. The crop has a beneficial effect on soil and on succeeding crops on level lands and competes with all the crops in the system.

It is estimated that owing to increasing demands future production will be about three times as high as in 1935-9, yet somewhat lower than in recent years owing to a relatively lower price.—E.B.H.

Varieties

161 Weber, C. R., and Weiss, M. G. **Adams—a new soybean.** *Soybean Digest* 1949. **9.** 14-5.

This new variety has resulted from the hybridization of Dunfield and Illini varieties at Iowa Experiment Station in 1938. It has inherited the parental white flowers and grey pubescence and produces light-coloured, three-seeded pods, the seeds being pale yellow with a buff to light brown hilum.

The crop is slightly superior in performance to the Lincoln variety, having somewhat higher yield, ripening about a day earlier, standing a little more upright and yielding rather more oil.

The method of distribution for Adams following that of Lincoln, Hawkeye and Clinton oats, will be by means of a seed-distribution committee. It is hoped that it will be easily available within 2 years; it should supplement Lincoln and not replace it.—E.B.H.

162 Saboe, L. C. **Monroe—a pre-wheat variety for Northern Ohio.** *Soybean Digest* 1949. **9.** 18-9. [U.S. Dept. Agric. and Ohio Agric. Exp. Sta.]

The Monroe variety of soybean resulted from the hybridization of the Mukden and Mandarin varieties at Urbana III in 1937 and was developed by the Ohio Agricultural Experiment Station and the U.S. Regional Soybean Laboratory.

Monroe stands better and matures 5 days earlier than Earlyana, hitherto the earliest recommended variety, to which it is similar in height, yield, protein and oil content. It is 4-5 in. taller than Richland, matures 10 days earlier and has an equal yield but does not stand so well. It is not a perfectly satisfactory variety, but its early maturation permits early seeding of winter wheat and herein lies its value to farmers.—E.B.H.

163 KALTON, R. R. **Soybeans in the Texas Blacklands.** *Soybean Digest.* 1949. **9.** 18-9, and 32.

The Texas Research Foundation is concerned with experiments on the effect of date of planting of soybean seed, and experiments on breeding. The results of the plantings have shown that either early plantings of early varieties (Monroe, Lincoln, Chief, and S-100) or late plantings of late varieties, (Ogden, Roanoke, CNS, Acadian and Yelnando) solved the problems of root rot, seed quality, yield and insect injury.

The primary object of the improvement programme is to determine whether undesirable features such as seed shattering, and bad quality can be overcome by selection of hybrid populations. —S.D.

Seeds

164 DJU, Dsai-Chwen and McCAY, C. **Vigor and viability in soybeans.** *Soybean Digest.* 1949. **9.** 22-4.

Extensive tests on vigour and viability were recently carried out on the Earlyana soybean seed at Ithaca, N.Y. to ensure the edibility of the sprouted beans. The ancient Indian methods of storing beans coated with castor oil or wood ashes assisted in maintaining vigour whereas storage in nitrogen, carbon-dioxide and *in vacuo* had no effect either on vigour or viability. These characters were maintained much better in low temperature storage than at room temperature, but dehydration injured viability and vigour; beans containing more than 32 per cent moisture were injured by exposure to high temperatures of 50-55°C. but beans containing 25 per cent or less of moisture were not injured by a week of exposure in frozen storage at 20°C., yet with a moisture content of 50 per cent such beans were seriously injured by 8 hours of exposure.—E.B.H.

Fertilizers

165 PROBST, A. H. **Soybean fertilization in Indiana.** *Soybean Digest* 1949. **9.** 18-21.

Inoculated soybeans supply most of their own nitrogen, but they need a considerable amount of phosphate and potash, and although their response to good soil management (liming of acid soil, ploughing in crop residue, returning manure and adequate applications of potash and phosphate and ample supplies of N) is less satisfactory than for other grain crops grown in rotation, yet it is sufficiently good to justify continuation of treatment.

Soybeans will usually respond to direct fertilization, so long as it does not actually come into contact with the seed, and applications of the recommended fertilizer have resulted in 5 to 8 bu. per acre increase in many cases, and a hastened maturation and improved seed quality.

Nitrogen in a mixture of phosphate and potash produced no beneficial results; superphosphate is superior to rock phosphate in that a higher yield is obtained, but the most spectacular increase is obtained from commercial manganese mixed with the recommended fertilizer applied to manganese-deficient soil (seen in yellowing leaves), when a 4 to 12 bu. per acre increase was obtained.—E.B.H.

166 KLEMME, A. W. **Fertilizing for soybeans.** *Soybean Digest* 1949. **9.** 22-3.

Owing to its limited root surface, the soybean for satisfactory yield must have soil of consistently high fertilty, such as that along the Missouri and Mississippi rivers. Most upland soil is of low fertility and requires treatment.

Soybeans require calcium, phosphate and potash, in quantity determined by soil tests, and to this end, limestone is the most beneficial and economical, providing lime and calcium, correcting soil acidity, increasing the efficiency of soybean bacteria, helping the plant to receive atmospheric nitrogen and raising the protein content of seed. Tests have shown an increased yield of soybean seed by 7.4 bu. per acre, an increased protein content of soybean seed from 37 to 39.75 per cent, but the oil content shows a decrease under the influence of limestone.

Heavy applications of limestone are required until the soil has reached a high level of fertility and thenceforward small applications can be used for maintenance and can be applied to other crops in the rotation. Where soybeans are grown in rotation, direct application of fertilizer is unnecessary. Where heavy applications are impracticable " split " applications can be used, i.e., half of the application is used initially and repeated ahead of each crop until the phosphate levels are built up.

The use of sweet clover in the rotation, the ploughing in of stalks and straw and liberal applications of fertilizer will maintain soil fertility and help to combat erosion.—E.B.H.

ROOT CROPS

BEET

Fertilizer

167 Sayre, C. B., and Vittum, M. T. **Effect of sodium salts and rate of seeding on the yield of beets.** *Agron. J.* 1949. **41.** 235-9. [N. York State Agric. Expt. Sta., Geneva]

Where table beets are purchased on a graded basis with a premium for small-sized beets, the net returns can be increased by heavier rates of seeding provided the beets receive adequate fertilizers including sodium. Increasing the rates of seeding from 9.8 to 15.6 lb. per acre did not affect the total tonnage of beets per acre, but did significantly and profitably increase the proportion of the more valuable smaller-sized beets. There was a large reduction in stand due to increasing competition for nutrients as the beets developed.

In Western New York, beets require sodium in addition to a complete fertilizer. 500 lb. of sodium chloride per acre or the equivalent amount from nitrate of soda, sodium sulphate, or soda ash have given excellent results. Nitrate of soda was the most effective source of sodium. 500 lb. of salt gave as good or better results than 1000 lb. of salt per acre. Sodium improves the colour and flavour of beet leaves and makes them stronger, more erect and more suitable for machine harvesting.—From authors' summary.

SUGAR BEET

Agronomy

168 СИНЯГИН, И. И. Сахарная свекла в нечерноземной полосе. *Совет. Агрон.* 1949. *No.* 5. стр. 65-74.

Sinjagin, I. I. [**Sugar beet in the non-black earth zone.**] *Sovet. Agron.* 1949. No. 5. 65-74.

Growth and development of sugar beet in the non-black earth zone possess some peculiarities in comparison with the main beet growing zone. Under the influence of other soil/climatic conditions the beet plant changes its rate of growth and development and shows itself capable of giving a high yield of good quality in the non-black earth region also. The correct basis of agrotechnique of sugar beet in the non-black earth region, as also in the Ukraine and in the central black earth zone, is the ley system of agriculture. In herbage rotations sugar beet utilizes effectively farm manure and mineral fertilizers when increases of yield per unit of manure applied in the non-black earth zone are higher than in the principal beet-growing region. On acid podzol soils liming is obligatory for the cultivation of beet. Increasing the depth of the ploughed layer of soil is of great importance for the successful growing of this crop. On poorly cultivated podzol soils and also on some excessively wet soils of the non-black earth region, it is appropriate to use ridge sowings. Seed of sugar beet can be successfully produced in the south and central parts of the non-black earth region. Having regard to the short duration of the growing period here, it is advisable to utilize means of accelerating the development of the plants.—R.P.J.

169 ГУДВИЛ, С. В. Значение сроков посадки семенников сахарной свеклы. *Агробиология* 1949. *No.* 2. стр. 102-4.

Gudvil, S. V. [**The importance of dates of planting stecklings of sugar beet.**] *Agrobiologija* 1949. No. 2. 102-4. [Ljgov Plant Breed. Sta.]

An experiment was initiated in 1945 at the above Station to ascertain the effect of different dates of planting stecklings of industrial beet. Planting was carried out at intervals of 5 days in the course of a month beginning on April 25. Plantings on 25 April and 1 May resulted in uniform development of flowering stems, which on 15 June constituted 90 to 97 per cent. Plantings on 20 and 25 May were backward in development and on 15 June yielded only 9 to 23 per cent fertile stems. Flowering with the early sowing dates set in on 5 July; with the late dates it began from 14 to 19 July. Seed from the first date of planting was harvested on 22 August, from the last on 6 September.

The yield of seed following the early planting dates 1 and 5 May was 26.5 centners per ha. and following the last two dates 20.2 centners or 24.5 per cent less.

Energy of germination (after 5 days) was determined in 1947 and was 84 per cent for seeds from the first sowing date and 69 per cent for the last two dates.

Sowings in 1947 with these seeds showed a close connexion between the degree of attack of the seedlings by black leg before thinning and energy of germination. When energy of germination was 65 per cent the percentage of attack was 49.2: when energy of germination was 84 per cent the percentage of attack was 24.0.

On the average of 2 years the reduction in yield of roots when seed from stecklings planted on 20 and 25 May was used was 12 per cent compared with seed from stecklings planted on 25 April. The yield of sugar with the use of seed from late plantings was reduced by 6.3 centners per ha, or 12 per cent. Density of plots was less from seed from late planted stecklings and the beets were less resistant to diseases. Percentage of bolting following the use of seed from stecklings planted on 1 and 5 May was 0.5 ; on 10 and 15 May 2.1 ; on 20 and 25 May 4.5.—R.P.J.

170 Panella, A. Intorno al metabolismo della barbabietola da zucchero. Rilievi preliminari sui consumi idrici in diverse condizioni di ambiente. [**On metabolism of sugar beet. Preliminary observations on water consumption in different environmental conditions.**] *Industr. saccar. ital.* 1949. **42.** Nos. 3-4. 92-100.

This article refers to trials with plants grown in cement basins in conditions of deficiency of water and nutritive substances. The conclusions are thus summarized : (a) deficiency of nutritive substances has more evident effects than water deficiency ; (b) plants make a better use of the available water on rich soils than on poor soils ; (c) during the warm summer period transpiration increases, while production of dry matter decreases. Some conclusions for cultivation of the crop in Central Italy are drawn. On poor soils it is of first importance to supply the necessary substances by means of fertilizers. Subsequent irrigation should start at the end of spring when the plants are in a phase of intense growth, with the purpose also of storing water in the soil if irrigation water is not available during summer. Trials are to be continued. [See also *Fld Crop Abstr.* 2, Abs. 349, 1949.]—E.B.

171 Baldoni, R. Esperienze sull'epoca di semina della bietola. [**Trials on date of beet sowing**] *Industr. saccar. ital.* 1949, **42.** 69-77.

In an introductory discussion the author points out the advantage of an early sowing under Italian conditions where the vegetative cycle of beet is interrupted by summer drought. Often, however, it is difficult to sow early because climate may hinder preparatory cultivation, especially on heavy soils which are predominant. The author refers to a trial carried out in 1948 at Corticella on irrigated and non-irrigated plots by the Agronomy Institute of Bologna University. The purpose of this trial was to study the effect on productivity of sowing on 8th March, 23rd March (usual sowing period) and 12th April, and also the effect of broadcast and localized manuring. Results proved that, although the climatic conditions of the year were particularly favourable to beet cultivation (high rainfall and mild temperatures), average yield reduction, calculated for every day of delayed sowing (from 8th March to 12th April) was 148 and 145 kg. of sugar per hectare in the dry and irrigated plot respectively. Irrigation gave increase in root weight and also in sugar yield. Localized manuring, which in normal years is responsible for a quicker growth of the young plants, in 1948 did not give such results. Some agronomical conclusions are drawn, among which is the need for soil cultivation before winter in order to insure an early sowing.—E.B.

172 Scaramella Petri, Piera. La bietola da zucchero in coltura autunno-invernale. [**Autumn-winter cultivation of sugar beet.**] *G. Agric. Domen.* 1949. **59.** 203.

This plant is native in the Mediterranean regions, where it vegetates from autumn until spring, and then flowers. In North Italy sugar beet is grown in spring/summer cultivation, but full development is already reached in June-July. Sugar production in these regions is lower than in Central Europe because of the shorter vegetative period and of the phenomenon of sugar disintegration. It is proved that with temperatures above 25°C. photosynthesis decreases, while respiration and transpiration increase. The latter activities cause the formation of salts which are impurities in the process of sugar extraction. The environment gradually becomes more unfavourable to a profitable spring/summer cultivation in Central and South Italy. In these regions autumn/winter cultivation is more convenient. Where summer irrigation is available the best results are obtained with plants sown in August. At the end of October they are completely differentiated ; during winter the sugar content gradually increases and a high degree of purity is maintained. Harvesting takes place in the middle of March. (See also *Fld Crop Abstr.* 2, Abs. 951, 1949).—E.B.

173 Fife, J. M., and Price, C. **Changes in root weight of sugar beets during their reproductive phase.** *Proc. Amer. Soc. Sug. Beet Technol.* 1948. 196-203. [Divn. Sugar Plant Invest., Bar. Pl. Ind., U.S. Dept. Agric.]

Sugar beets of easy bolting type (SL 2850 and U.S. 33) were grown for seed production by the field-overwintering method under conditions that brought about essentially complete reproduction. The roots of these sugar beets did not continue to increase in weight after the reproductive phase began. By contrast, sugar beet roots in which the degree of reproduction indicated inadequate thermal induction increased in root weight, the greatest increase occurring in small roots. In another test, extended thermal induction treatment was given prior to transplanting the roots for seed production. All plants produced seed stalks. Some gain in root weight occurred after transplanting. There was a significant negative correlation between the gain in weight and the root weight at time of transplanting. This may indicate that root size is an important factor in the thermal induction process.—Authors' summary.

174 Coons, G. H. **The sugar beet: product of science.** *Sci. Mon.* 1947. **68.** 148-164. [Received 1949]

The creation of sugar beet out of mangel-wurzel, its complete history, and all early work on its breeding in Europe and America are reviewed. Breeding for disease resistance was started at the Bureau of Plant Industry in 1925. There is a brief account of harvesting machines, and the future of the sugar beet industry is discussed.—S.D.

Varieties

175 Kohls, H. L. **Hybrid sugar beets in Michigan.** *Quart. Bull. Mich. agric. Exp. Sta.* 1949. **31.** 406-8.

Since the receipt of a few male-sterile sugar beet plants, the Michigan plant breeders have obtained successful hybrids 125 and 148. Hybrid 125 grown at nine centres in 1948 gave the following average results; the corresponding data for the commercial U.S. 215 x 216/3 are given in brackets: yield in tons per acre 18.0 (16.0); per cent sugar 17.36 (17.29); per cent purity 84.45 (84.46); recoverable sugar per acre in pounds 5324 (4779). The differences in yield and recoverable sugar are significant.—K.J.S.

176 Price, C., Owen, F. V., and Carsner, E. **A new sugar beet variety, U.S. 56, for fall and winter planting in California.** *Proc. Amer. Soc. Sug. Beet Technol.* 1948. 181-6. [Divn. Sugar Plant Invest., Bur. Pl. Ind. U. S. Dept. Agric.]

In resistance to downy mildew U.S. 56 is similar to U.S. 15 which has been used widely for planting in autumn and winter in California; it is, however, slightly less liable to bolt, and is much more resistant to curly-top. Where curly-top is important, the new variety greatly outyields the old.—G.K.G.C.

177 Murphy, A. M., Owen, F. V., and Ryser, G. K. **New sugar beet strains from U.S. 22 with higher curly-top resistance.** *Proc. Amer. Soc. Sug. Beet Technol.* 1948. 179-80. [Divn. Sugar Plant Invest. Bur. Pl. Ind., U.S. Dept. Agric.]

One selection is being propagated for commercial use; two others, selected for resistance, are being evaluated agronomically.—G.K.G.C.

178 Dahlberg, H. W., and Brewbaker, H. E. **A promising sugar beet hybrid of the Milpitas wild type × commercial.** *Proc. Amer. Soc. Sug. Beet Technol.* 1948. 175-8. [Great Western Sugar Co., Longmont, Colo].

An account of the development of a new strain, resistant to Cerospora leaf spot using *Beta maritima* growing wild in California for crossing with commercial material.—G.K.G.C.

Seeds

179 Rasmusson, J. Behandling av utsäde med Azotobacterkulturer, radivit och euradin. Försök med sockerbetor. [**Treatment of seed with Azotobacter cultures, radivit and euradin. Trials with sugar beets.**] *Landbruks. Jordbruk. Medd.* 24. 1948. 50-55. [English summary 55.]

During 1943 field trials with sugar beets were conducted at ten different places in South Sweden, to determine whether inoculation of the seed with a culture of Azotobacter would increase the yield. The inoculation was made with Azotobacter culture alone as well as in combination with " radivit " and potassium salt of napthol acetic acid. The soils varied from very light sandy soil to heavy clay with a high content of organic matter. pH varied from 5.5 to 7.5. The treatment had no positive effect on yield or on sugar content of the beets.—R.P.J.

180 Pendleton, R. A. **Spacing sugar beet for seed production.** *Proc. Amer. Soc. Sug. Beet Technol.* 1948. 204-7. [Divn. Sugar Plant Invest., Bur. Pl. Ind., U.S. Dept., Agric.]

Replicated trials in the Willamette Valley and in the Medford area of Oregon indicated that, within limits, spacing had little effect on the seed yield per acre of irrigated sugar beet over-wintered in the field: the best range was from 30,000 to 100,000 plants per acre. In trials with no irrigation, seed yield was reduced only at the widest spacing. Observations indicated that varieties slow to bolt should be sown early to ensure seeding.—G.K.G.C.

181 Armer, A. **A mechanical spray treater for sugar beet seed.** *Proc. Amer. Soc. Sug. Beet Technol.* 1948. 108-13. [Spreckels Sugar Co., Spreckels, Calif.]

The machine developed consists of a drum with internal vanes; after a batch of seed has been loaded the drum is rotated horizontally while the thin falling sheets of seed are sprayed with a preparation of phygon (2, 3- dichloro-1,4- naphthaquinone) using sugar beet molasses as sticker. The treated seed showed satisfactory resistance to damping-off organisms: it was not irritant or toxic to those who handled it.—G.K.G.C.

182 Pendleton, R. A. **Thermal induction and reversal in relation to beet seed production.** *Proc. Amer. Soc. Sug. Beet Technol.* 1948. 192-5. [Divn. Sugar Plant Invest., Bur. Pl. Ind., U.S. Dept. Agric.]

Seed yield depends on size of root in table beet and sugar beet. Because it is not feasible to store large roots for commercial seed production, it is desirable to stimulate root growth after transplanting. With table beet partial reversal of thermal induction, which could be brought about by topping short seed stalks just before transplanting in April, by delaying transplanting, or by exposure to warm conditions before transplanting, led to resumed root growth and so to increased seed yield per plant. It has not yet been possible to increase the seed yield of sugar beet satisfactorily by this technique. —G.K.G.C.

183 ANDERSEN, A. M. **The effect of pretreatment and substrata on the germination of sugar beet (*Beta vulgaris* L.) seedballs.** *Proc. Amer. Soc. Sug. Beet Technol.*, 1948. 95-9. [Production and Marketing Administration, Grain Branch, U.S. Dept. Agric. Washington, D.C.]

Washed and untreated sugar beet seed clusters were germinated on blotters, on a 20-ply *crêpe* paper, and in a mixture of soil and sand; counts were made after 14 days at alternating temperatures of 20°C. and 30°C. Washing reduced the proportion of browned seedlings in the blotter tests; on the other media washing did not affect the proportion of browned seedlings, which was much smaller.—G.K.G.C.

184 TOLMAN, B. **Some field conditions which influence germination technique.** *Proc. Amer. Soc. Sug. Beet Technol.* 1948. 93-4. [Utah-Idaho Sugar Company, Salt Lake City, Utah]

Seed of sugar beets grown on saline soil, or receiving heavy, late applications of nitrogenous fertilizers, show delayed and reduced total germination. The nitrogenous substances responsible may be removed by washing the seed clusters in running water for 2 hours before germination.—G.K.G.C.

185 DOXTATOR, C. W., and DOWNIE, A. R. **Beet seed germination methods.** *Proc. Amer. Soc. Sug. Beet Technol.* 1948. 81-2. [American Crystal Sugar Co., Rocky Ford, Colo]

A Boerner sampler is used to extract above 200 seeds from a sample. Duplicate samples of 100 seeds are washed in running water for 5 to 6 hours. After draining, each sample is spread over half a soaked and drained standard 9 in. × 16 in. germination blotter, the other half being used as a cover. Tests are made during spring and autumn, when temperatures normally fall within the range 21° C. to 26° C., because the Minnesota Seed Germinator is used without temperature control. Counts are made on the 3rd and 10th day.—G.K.G.C.

186 LACKEY, C. F. **Chemical loosening of seed caps in relation to germination of sugar beet seed.** *Proc. Amer. Soc. Sug. Beet Technol* 1948. 66-9. [Division of Sugar Plant Investigations, Bur. Pl. Ind. U.S. Dept. Agric.]

Seed caps on sugar beet seed clusters were loosened by soaking the seed in 3 per cent hydrochloric acid or in 3 per cent sulphuric acid for 2 hours; treated seed, washed for 2 hours before sowing, showed increased germination, and seedling emergence was advanced. The effect on germination was more marked with hard than with soft seed.—G.K.G.C.

187 LAMBDIN, R. S., and BUCKINGHAM, W. H. **Beet seed decortication with a commercial huller.** *Proc. Amer. Soc. Sug. Beet Technol.* 1948. 100-1. [Spreckels Sugar Co., Spreckels Calif.]

Sheared seed is rubbed in its passage through the huller, which consists of a rubber-lined tapered cylinder rotating at 800 rev. per min. in a rubber-lined tapered chamber. After cleaning and screening the seed is rounder than segmented seed; it has given satisfactory stands with a precision planter and is acceptable to growers.—G.K.G.C.

188 SAXTON, H. B. **Method of germinating segmented sugar beet seed used by the Great Western Sugar Company.** *Proc. Amer. Soc. Sug. Beet Technol.* 1948. 85-6.

——————— **Method of germinating segmented beet seed.** *Proc. Amer. Soc. Sug. Beet Technol.* 1948. 87-92. [Longmont, Colo]

The first paper outlines the method used; the second includes detailed instructions. The segmented seed is passed over a 10-mesh sieve to remove small particles. Four samples of 100 seed particles, selected by a Boerner sampler are washed, drained and germinated on wet blotters at 27° C. to 30° C. Doubles are recorded. Certain types of sprout are rejected as abnormal.—G.K.G.C.

189 ROBERTSON, L. S., BELL, R. W., COOK, R. L., and FAIRCHILD, H. W. **A comparison of segmented with natural sugar beet seed.** *Quart. Bull. Mich. agric. Exp. Sta.* 1949 **31.** 465-71.

Results obtained in 1945, 1946 and 1948 are presented for seed germination, pre-blocking stand, post-thinning stand, number of marketable beets, acre-yield and labour requirements in thinning. The observations show amongst other things that germination did not exceed 30 per cent when segmented seed was planted; that only 80 per cent of the seedlings constituting the post-thinning stand attained marketable size at harvest; that rate of fertilizer application had no effect on germination stand or percentage of beet seedlings reaching marketable size. The belief is strengthened that, stand for stand, beets grown from segmented seed yield as much or more than those grown from natural seed. The use of segmented seed resulted in a labour saving of 31.3 per cent in blocking and thinning as compared with the use of natural seed.—K.J.S.

190 Bush, H. L. **Field compared with blotter germinations for processed, graded, single and double-germ seed.** *Proc. Amer. Soc. Sug. Beet Technol.* 1948. 70-7. [The Great Western Sugar Company Experiment Station, Longmont, Colo]

In trials conducted in 1946 and 1947, germination of all types of seed in the field was generally lower than in the laboratory, but the proportion of singles was higher. Whole and segmented seed of the same size differed little in field behaviour, but commercial decortication depressed emergence apparently through injury. The highest proportion of singles (99 per cent in the laboratory, 97.9 per cent in the field) was obtained by extracting what was virtually single-germ seed from a double-germ strain ; this seed passed through a 6/64 inch slotted sieve and was retained over 6/64 inch round sieve.—G.K.G.C.

191 Cormany, C. E., and Peterson, D. F. **Stand count comparisons of segmented and decorticated sugar beet seed.** *Proc. Amer. Soc. Sug. Beet Technol.* 1948. 117-9. [Holly Sugar Corporation, Sheridan, Wyo.]

In field trials in Montana, Wyoming and Colorado sown in the spring of 1947, decorticated seed gave a slightly higher pre-thinning stand count, with a lower proportion of singles than segmented seed ; with U.S. 22, used at only one site, decortication improved emergence by 24.5 per cent. In commercial fields decorticated seed gave stand counts 3.75 per cent better before thinning and 6 per cent better after thinning than segmented seed.—G.K.G.C.

192 Doxtator, C. W. **Comparison of Clipper and Eureka cleaning mills on sizing of segmented seed.** *Proc. Amer. Soc. Sug. Beet Technol.* 1948. 125-8. [American Crystal Sugar Co., Rocky Ford, Colo]

The marked difference in size of segmented seed graded between similar screens in two commercial machines is ascribed to differences in the method of shaking the screens.—G.K.G.C.

193 English, J. G. **Decorticated seed—one year's experience.** *Proc. Amer. Soc. Sug. Beet Technol.* 1948. 102-5. [Great Western Sugar Co., Sterling, Colo]

Decorticated and segmented sugar beet seeds were drilled in seventy-two observation trials in various districts of Colorado, Nebraska, Wyoming and Montana. In general, decorticated seed produced a better stand, with greater and more rapid emergence and shorter gaps ; the proportion of singles, however, was lower than with segmented seed. To secure comparable germination and a similar proportion of singles, decorticator settings may have to be altered for different lots of seed.—G.K.G.C.

194 Brown, R. C. **Experience with decorticated seed on 30,000 acres.** *Proc. Amer. Soc. Sug. Beet Technol.* 1948. 114-6. 1949. [Holly Sugar Corporation, Brawley. Calif.]

In four trials on different soils in various parts of the Imperial Valley, decorticated U.S. 15 sugar beet seed produced a slightly greater stand count with fewer gaps than did sheared seed of the same strain : both types were screened between 7/64 inch and 9/64 inch and sown with the same planter. In 1947 decorticated seed was used in over 28,000 acres of commercial acreage.—G.K.G.C.

195 МИХАЙЛЕНКО, Е. А. **Об эффективности посева сахарной свеклы дроблеными семенами.** *Совет. Агрон.* 1949. *No.* 5. стр. 75-84.

Mihaīlenko, E. A. **[The effectiveness of sowing segmented seed of sugar beet.]** *Sovet. Agron.* 1949. 75-84.

Mechanical splitting of the seed clusters with existing machines is unsatisfactorily performed. Segmentation resulted in a high percentage of damaged, hulled and destroyed seed (in the writer's trials 21 per cent). Segmented seed has lower germination, and energy of germination is decidedly inferior to that of ordinary seed.

On some collective farms in the Žitomir province the number of plants per linear metre before singling was only half the number from ordinary seed (ordinary seed 28.7 and segmented seed 14.3). Sugar beet plots sown with segmented seed are less resistant to unfavourable conditions particularly in the early spring period of growth. (In the Žitomir province 37 per cent of the sugar beet plots on the collective farms concerned were resown). With segmented seed, vernalization, which quickly increases the yield of sugar beet, cannot be employed. Mechanization of singling is almost impossible with such sparse sowings. Yield and sugar content of roots of sugar beet from plots sown with segmented seed are lower.—R.P.J.

Fertilizers

196 Aldrovandi, A. La concimazione localizzata nelle prove di grande cultura. **[Localized manuring in trials of wide cultivation.]** *Industr. saccar. ital.* 1949. **42.** 130-6.

The author refers to trials of localized beet manuring which were carried out for 2 years in various zones of Italy. The best results were obtained by broadcasting from 2 to 4 q. of superphosphate before sowing and then supplying 2 q. of superphosphate and 0.5 quintal of ammonium sulphate per hectare, localized near the seeds. Machines which sow the seed and at the same time distribute the fertilizer in granulated form are now available, and usual drillers can be easily transformed to this type of machine by the addition of special parts. Even in 1948 (a year particularly favourable to beet cultivation) localized manuring was on the whole effective, especially on soils of a low natural fertility. By this manuring system, the young beet plants have a quick and vigorous start.—E.B.

197 FLAMINI, B. Nuovi fertilizzanti in prova nella concimazione della bietola. [**New fertilizers under trial in beet manuring.**] *Industr. saccar. ital.* 1949. **42.** 137-41.

198 ALDROVANDI, A. Effetti della siccità e della concimazione chimica sul valore industriale della barbabietola da zucchero. [**Effect of drought and chemical manuring on the industrial value of sugar beet.**] *Industr. saccar. ital.* 1949. **42.** 181-200.

Results of trials carried out at the Rovigo Experimental Station for Beet Cultivation have confirmed that, in the region of the experiments, drought conditions result in a larger quantity of impurities and of nitrogenous compounds in the summer harvested beets. Higher rainfall and irrigation are therefore useful. An excessive nitrogen manuring is also detrimental, but such effect is insignificant with manuring up to 3 q. per ha. (45 units of nitrogen) even on soils of a high fertility as those of the trials.—E.B.

199 SCARPONI, F. Azione dei diversi concimi fosfatici, azotati, potassici, nella produzione della bietola zuccherina in rapporto a varie modalità di distribuzione. [**Action of the various phosphorus, nitrogen and potassium fertilizers on sugar beet production in relation to different systems of distribution.**] *Industr. saccar. ital.* 1949. **42.** 60-8.

[See *Fld Crop Abstr.* 2, Abs. 328, 1949.] Research was continued in 1948 in the Experimental field of Agronomy of the Bologna University (Emilia region). The climatic conditions of these trials were the opposite of those in the previous trials, with high rainfall and mild temperature during the whole vegetative period. Conclusions reached, which apply to regions of the same pedologic and climatic characteristics, are as follows: (a) nitrogen is the most effective fertilizer, having a conspicuous action even when the soil contains large quantities of this element; (b) although during the first stage of development beet absorbs great quantities of phosphorus, this fertilizer gives insignificant increase in production; (c) on soil rich in potassium, K manuring was effective in years of drought and with localized distribution, while in years with a high rainfall it has proved ineffective and even harmful. Localized distribution of the fertilizer (at 10 cm. depth in the furrow) is advised.—E.B.

Machinery and Equipment

200 TINGLEY, R. J. **Two seasons' experience with beet seed decorticating equipment.** *Proc. Amer. Soc. Sug. Beet Technol.* 1948. 106-7. [Holly Sugar Corp., Stockton, Calif.]

Sugar beet seed is fed into the centre of a steel burr plate, below which revolves a 10-inch carborundum grinding wheel mounted on a vertical shaft; from this first mill the seed passes into the centre of a rubber-faced plate below which revolves a 20-inch carborundum wheel. The settings of the two mills are determined for each lot of seed by sorting the product with hand screens. The seed is then sized through round hole screens, polished in a sandpaper faced disc machine. Light seed is removed over a "gravity-table" separator. About 500 lb. seed per hour is the capacity of a machine; recovery averages 60 per cent.—G.K.G.C.

Technology

201 BORGHI, M. Distribuzione dello zucchero e dei principali componenti nella bietola. [**Distribution of sugar and of the principal constituents in beet.**] *Industr. saccar. ital.* 1949. **42.** 201-13. [Lab. sper, Soc. Produttori Zucchero]

After reviewing the literature on the subject the author gives an account of research carried out on beets of the 1948 harvest year, grown in the Emilia region. The beets are divided into numerous zones or layers by a new and precise method and results of the examination are tabulated. Conclusions as a whole agree with those previously reached by foreign authors in as much as the intermediate layer is purer and richer in sugar than the internal and external zones, but there is some discrepancy with regard to the distribution of impurities (these are generally higher in the Italian beets in comparison with the beets of other European countries). Also the sugar content in secondary roots and in the capillary system is investigated.—E.B.

Diseases and pests

202 ТВЕРСКОЙ, Д. Л. Новое о корнееде сахарной свеклы. *Агробиология* 1949. *No.* 2. стр. 123-40.

TVERSKOĬ, D. L. [**Recent information concerning black-leg of sugar beet.**] *Agrobiologija* 1949. No. 2. 123-40. [Moscow, All-Union Sci. Res. Inst. of Beet Production]

The development of "black leg" is mainly due to the soil parasitic fungi *Pythium de baryanum* and *Alternaria cochlioides*. *Phoma betae* is of secondary importance. Among measures of control recommended are the introduction of herbage rotations, and drainage of wet soils where the sub-soil water is at a high level.—R.P.J.

203 Jannone, G. Esperimenti comparativi sulla tossicità di varie sostanze a base di esaclorocicloesano e di diclorodifeniltricloroetano contro le larve di *Melolontha melolontha*(L.) [**Comparative trials on the toxicity of various substances based on hexachlorocyclohexane and dichlorodiphenyltrichloroethane against the larvae of *Melolontha melolontha* (L.)**] *Industr. saccar. ital.* 1948. **41.** 55-61.

Trials *in vitro* were carried out to test several commercial insecticides on *M. melolontha*, a parasite of the root and of the aerial part of sugar beet. Results indicate that all the products used in contact destroy the larvae. In a series of trials in which the products were tested per asphyxia, a similar but slower action was observed with all the compounds based on hexachlorocyclohexane ; on the contrary, Gesarol (based on dichlorodiphenyltrichloroethane or DDT) has proved ineffective. In the field, these insecticides should be used in powder form at the rate of at least 20 kg. per ha., or in the liquid form during the warm season, when the larvae come near to the surface of the soil.—E.B.

204 Melis, A. Contributo alla ricerca dei mezzi di lotta contro il cleono ed altri insetti delle bietole con prodotti di sintesi (DDT ; $C_6H_6Cl_6$) ed arsenicali. [**Contribution to the research of controlling *Cleonus* and other insects of sugar beet with synthetic products (DDT ; hexachlorocyclohexane) and with arsenical products.**] *Industr. saccar. ital.* 1949. **42.** 1-19.

A series of trials was carried out in spring, 1948, on plots of young beet plants near Cecina (Tuscany). Results proved that in most cases the synthetic products used either as powder or in suspension in water were effective. As in few cases results were contradictory, further study of the matter is required.—E.B.

BRASSICA

Varieties

205 Olsson, G. Olika Brassica-arters förmåga att korsa sig med varandra. [**The capacity of different species of *Brassica* to cross with one another.**] *Sverig. Utsädesför. Tidskr.* 1949. **59.** 196-228.

Results are presented of many artificial crosses between different species of *Brassica* and between different sorts and varieties of the same species, which tests have been carried out by the Swedish Seed Association and the Institute of Genetics of Lund University.

B. nigra is crossed only with difficulty with other *Brassica* species. The forms of *B. oleracea* are easily crossed with one another, while kale is crossed with other *Brassica* species only with difficulty. The different varieties of *B. campestris* are crossed relatively easily with different varieties of rape. *B. napus* includes the two varieties rape and swede, and crosses between them occur as easily as between different sorts of rape and swede respectively. The risk of crossing between rape or swede and kale is relatively slight. *Sinapis alba* does not cross with *Brassica* species, and between the latter and *Sinapis arvensis* it is only with great difficulty that it has been possible to obtain hybrids by means of artificial crosses.—R.P.J.

Seeds

206 Wiksell, G. Om äkthetsbestämning av Brassica-arters frön. Preliminärt meddelande [**On determination of genuineness of seeds of *Brassica* species. Preliminary report.**] *Medd. Frökontrollanst.* 1949. No. 24. 46-52. [English summary, 52]

During the last few years an increasing number of seed samples of different *Brassica* species has been received at the Swedish State Seed Testing Station. Inspection showed that in many cases the kinds of seed had been confused or mixed. Investigations were carried out in order to find reliable characters suited to a not too laborious method of analysis for separating the different kinds of *Brassica* seeds. A number of samples have been analysed according to such a method as to species and in some cases also as to variety. The separated samples were subsequently sown in the field and the results of the laboratory investigations controlled by inspection of the growing plants.

The investigations will be continued : the method can be employed to a certain extent for preliminary guidance. As soon as the characters of the different kinds of seed have been accurately established, a detailed description will be published, together with an account of a method used at the Station for several years for separating seeds of *Sinapsis arvensis* from seeds of *Brassica* species.—R.P.J.

CASSAVA

Agronomy

207 Herrera, J. L. Resultados preliminares sobre las investigaciones en yuca (*Manihot* sp.). [**Preliminary results of studies of cassava.**] *Not. agron., Palmira* 1949. **2.** No. 4. 43-56. [English summary, 55.] [Agric. Exp. Sta., Palmira, Colombia]

Natural conditions for the growing of cassava are excellent in Colombia, and for some years its cultivation and processing have been developing successfully. A programme of improvement now in progress at the Palmira Agricultural Experiment Station embraces, besides breeding, cultural methods; for which purpose variety trials, experiments in sowing and harvesting at different times, manurial trials, experiments in the use of cuttings of different size and age, in different planting distances, and in the use of phytohormones for improving starch production and stimulating the growth of cuttings, are now under way. Results are to appear in a subsequent publication.—G.M.R.

208 PACHECO, J. A. de C. A côr e a aparência do polvilho para exportação. [**The colour and appearance of starch for export.**] *Rev. Agric. Piracicaba* 1949. **24.** 167-80. [English summary, 179.] [Inst. Agron., Campinas, Brazil]

While this article is concerned mainly with the processing of cassava (*Manihot*) roots for starch, there is a note on the harvesting of the roots, which should not be done too soon before processing is to begin.—G.M.R.

OIL CROPS

GENERAL

209 CHEVALIER, A. Faut-il cultiver en France des plantes oléagineuses? [**Should oil plants be grown in France**?] *Rev. Bot. appl.* 1949. **29.** 224-6.

It is important for the French economy to reduce importation of fats. Colza, mustard and sunflower appear to have better chances than other plants of successful cultivation in France, but work of selection for local conditions is still to be done. Also in Morocco cultivation of oil plants, and particularly of linseed, is extending.—E.B.

210 BALDRATI, I. Plantes oléifères de l'Erythrée et de la Somalie italienne. [**Oil plants of Eritrea and Italian Somaliland.**] *Rev. Bot. appl.* 1949. **29.** 234-9.

This article is reported from *Olearia*, Rome, pp. 774-80, 1948. The plants considered are *Linum* (used in Abyssinia for human consumption; there are varieties immune to *Melampsora*), *Guizotia*, Indian mustard, *Carthamus tinctorius* (safflower), *Lepidium*, *Arachis*, *Sesamum* (the cake can be used for cattle feeding), *Cucumis melo* var. *agrestis*, sunflower, cotton, and *Argemone mexicana*. Vernacular names are given.—E.B.

211 CHEVALIER, A. Plantes oléagineuses annuelles à cultiver dans les pays tropicaux et spécialement en Afrique noire. [**Annual oil plants which could be grown in tropical countries and especially in Africa.**] *Rev. Bot. appl.* 1949. **29.** 205-23.

The interest of agriculturists is at present mostly concentrated upon *Arachis*, soybean and *Ricinus*. The author considers a number of plants which could be improved and their cultivation extended. A few species of *Sinapis* (*S. glauca*, *S. juncea*, and *S. dichotoma*) are grown in India for their grain which is rich in oil; of these, only *S. juncea* is grown in Africa. *Sesamum* is one of the oil plants more widely grown in the past in many warm regions. The Cucurbitaceae are generally grown for their pulp or for other purposes; the suitability of oil extraction from the seeds is examined. Among the Compositae, *Carthamus tinctorius*, *Guizotia abyssinica* and *Helianthus annuus* are grown in many tropical and subtropical regions but much work for their improvement is necessary. The author mentions also a number of plants which were grown in the past by the natives but are now abandoned.—E.B.

212 AGRONOMIE TROPICALE. Production soviétique des oléagineux. [**Soviet production of oil crops.**] *Agron. trop.* 1949. **4.** 424.

Data of production and of cultivated area are tabulated.—E.B.

BRASSICA

Agronomy

213 ANDRÉ, E. La moutarde blanche: plante fourragère, plante oléagineuse, plante condimentaire. [**White mustard as fodder, oil and condiment.**] *C. R. Acad. Agric. France* 1949. **35.** 199-202.

Habit and characteristics of *Sinapis alba* are discussed in relation to utilization. The adaptability of this plant to varying altitudes and conditions is noticeable in Holland, Scandinavia, France, Germany, Austria, Egypt and the Canary Isles. The crop is satisfied with medium quality soil, and the fact that the growth cycle is short (100 days) enhances its oil value where the winter is long and rigorous and the summer is short. In European countries, such as France, it is valued as a green fodder. About 45 days after sowing it can be used fresh or as silage. Hardiness compares favourably with that of colza and rape. As an oilcake it is not suitable for animal fodder as contact with water produces a reddening effect. Oil factories where seeds are triturated can draw part only of the residue to be sold as oil-cake fertilizer. Methods of treatment in the manufacture of table mustard are described. The three varieties used are *Brassica nigra*, *B. juncea*, and the white mustard *S. alba*.—M.L.Y.

SUNFLOWER

Agronomy

214 Tkatchenko, B. La culture du tournesol en U.R.S.S. [**Sunflower cultivation in U.S.S.R.**] *Rev. Bot. appl.* 1949. **29.** 227-34.
The subject is reviewed under the aspects of regions of cultivation, biological requirements, varieties, cultural methods, manuring, harvest, and yield.—E.B.

215 Elliot, H. G. **The sunflower (*Helianthus annuus*).** *J. Dep. Agric. W. Aust.* 1949. **26.** 44-9.
The shortage of vegetable oils has aroused the interest of Australian farmers in this crop. The article presents general information for the Australian reader and includes uses of the plant, varieties and oil content, value of residues, soils and climatic requirements, fertilizing, soil preparation and sowing, cutting for silage, yields, harvesting and threshing.—P.M.

Varieties

216 ЛУТЦО, В. П. О нектарности различных сортов подсолнечника. *Селек. Семеновод.* 1949. *No.* 7. стр. 80.

Lutco, V. P. [**On nectar formation in different varieties of sunflower.**] *Selek. Semenovod.* 1949. No. 7. 80.
Trials were conducted in 1948 in the Rjazan province in which ten varieties of sunflower were sown including the local variety "Gryzovoĭ." At the time of flowering the nectar was removed by means of strips of filter paper. The strips of paper were dried and kept for analysis. The percentage content of sugar was determined in the laboratory by means of a refractometer. The content of sugar in 100 flowers was then computed in milligrammes.

Tabulated information shows that the local variety "Gryzovoĭ" produced the largest amount of nectar on the average for the summer (10.1 mg. in one trial and 11.9 mg. in another). The largest amount of nectar was produced by all varieties in the period of full flowering which coincided with the highest atmospheric moisture.—R.P.J.

Seeds

217 England and Wales, Ministry of Agriculture and Fisheries. Advisory Leafl. 311. **Sunflowers as a seed crop.** 1949. pp. 5.
Sunflower seeds can be used as a supplementary poultry feed, for human food and as a source of edible oil and protein cake for stock feed. They can be either combine harvested using a slightly modified combine, or rubbed out by hand on a sheet of expanded metal. Details of harvesting, sowing, singling and cultivation are given. Small easy-to-dry heads are obtained by close spacing. Inter-row cultivation is the only method of keeping the crop clean because sunflowers are vulnerable to selective herbicides. Two semi-dwarf varieties, Pole Star and Jupiter, are recommended. Sown in March the flowers appear in July and the crop is harvested 50 to 65 days later. In early stages of development sunflowers are susceptible to wireworm attack and a blue grey mould, *Botrytis cinerea*, often appears in an unusually wet autumn.—E.B.H.

LINSEED

Varieties

218 Fina, A. L. de, and Sordelli, D. A. Notable modificación del grano del lino oleaginoso registrada dentro de un area reducida. [**Remarkable modification of linseed grain recorded within a small area.**] *Rev. Fac. Agron. La Plata* 1946. **26.** 5-27. [English summary, 27.] [Received 1949]
Data on the yield, thousand-grain weight and oil content of the linseed varieties 330 M.A. and H 39 M.A. sown monthly from April 22 to September 24, 1937, at Buenos Aires, are presented and analysed. Although the total area sown was only 84 by 48 metres, a remarkable modification in the above-mentioned characters was observed.

In the second part of the article, total correlation is studied in each variety between the different pairs of the three characters considered; partial correlation is also studied, keeping constant for each pair of variables the influence of the third variable.—From authors' summary.

219 Molfino, R. H. Influencia de la reacción del suelo sobre el rendimiento de un ensayo de linos oleaginosos durante el bienio 1940-1941. [**The effect of soil reaction on yield in a linseed variety trial, 1940-1941.**] *Rev. Fac. Agron. La Plata* 1948. **26.** 235-57. [English summary, 256-7.]
The highest yields were obtained at pH 7. The range of tolerance was determined as pH 6.6 to 7.6. In this, one of the twelve varieties tested, namely, H 39, an Argentine bred strain, was found to tolerate more acid conditions and a wider reaction range than did the remainder.—From author's summary.

220 Sanchez, M. R. Comportamiento agrícola de variedades de linos oleaginosos en La Plata durante el trienio 1938-1940. [**Behaviour of linseed varieties in the La Plata region during the period 1938 to 1940.**] *Rev. Fac. Agron. La Plata* 1946. **26.** 57-60. Received 1949]

The article comprises the summary and conclusions of a dissertation presented to the University of La Plata. Records were made of grain yield, thousand-grain weight and phenology in eight varieties of linseed, and within each variety a study was made of correlations between (a) yield and thousand-grain weight; (b) yield and height of the plants at maturity; and (c) thousand-grain weight and height of the plants at maturity.—G.M.R.

221 Bravo, M. V. Relaciones entre algunos factores de la calidad industrial del lino oleaginoso e influencia que sobre ellos ejercen el año, suelo y variedad. [**Relations between some factors of industrial quality in linseed and the effect upon them of year, soil and variety.**] *Rev. Fac. Agron. La Plata* 1948. **26.** 77-139. [Diss. La Plata]

Findings are based on a 3-year study (1938-1940). Fifteen linseed varieties were concerned, eight of which were grown successively in all 3 years. The first object of the study was to determine thousand-grain weight, oil content and iodine index in the different varieties, and to ascertain to what extent these three characters were influenced by variety or intrinsic varietal characters, year and soil in the experiment period. The term "year" indicates here the complex of conditions made up of rainfall, wind, frost, high temperatures, healthiness of the culture, rotation etc. (p. 107) in the respective years. The second object was to determine what correlations existed, within and among the varieties, between: (a) thousand-grain weight and oil content; (b) thousand-grain weight and iodine index; and (c) oil content and iodine index. The data obtained are presented in detail. The following are some of the findings. Thousand-grain weight: variation was governed, in diminishing order of importance, by variety, year and soil; it is a varietal character and appreciably constant. Oil content and iodine index: variation of each character was governed, in diminishing order of importance, by year, variety and soil. In each of the 3 years, plots exhibiting high or low oil content showed a tendency to exhibit high or low iodine index figures also, a fact interpreted to show a certain similarity in edaphic requirements.

Within the varieties, a positive correlation between thousand-grain weight and oil content was determined in all the varieties but one. The correlation between thousand-grain weight and iodine index, though positive in all the varieties, was highly significant, significant or not significant according to variety. Among the varieties, a negative correlation was determined between thousand-grain weight and oil content, or, in other words, large-grained varieties exhibited, in general, lower oil content than the small-grained varieties. The correlation between thousand-grain weight and iodine index, however, was positive, that is to say, the large-grained varieties exhibited in general a higher iodine index than the small-grained. No correlation was found between oil content and iodine index.—G.M.R.

Diseases and pests

222 May, A. W. S. **The control of *Heliothis* in linseed.** *Qd agric. J.* 1949. **68.** 216-20.

Flowering linseed is very attractive to *Heliothis armigera*. Linseed crops planted in late autumn rarely suffer damage from the pest until the seed capsules are forming in the following spring, a time when some of the moths will have emerged from their pupae overwintering in the soil and having matured their eggs will be seeking a suitable host. Control can be effected by the application of DDT, but pest damage in the spring can be offset by cultural methods. Early planted crops largely escape *Heliothis* damage, as the crops will have completed flowering before many moths have emerged and will no longer be attractive for egg-laying. Rate of seed sowing is an important consideration; it may govern the rate of crop development and the period of flower formation. Any tendency to prolong flower production will serve to increase the period that the crop is attractive for egg-laying. It is difficult to prevent some late flowers developing but where possible measures should be adopted to offset the tendency. A dense stand of plants not only suppresses weeds but ensures an even rate of seed development and will reduce the likelihood of prolonged flowering. These stands reduce the yield and may allow secondary branching and late flowerings if spring rains eventuate. A recommended seeding rate is 23-25 lb. per acre.—P.M.

HEMP

Seeds

223 АРИНШТЕЙН, А. И. Динамика накопления масла и изменение качества семян конопли при созревании. *Селек. Семеновод.* 1949. *No.* 5. стр. 48-50.

Arinšteĭn, A. I. [**Dynamics of the accumulation of oil and alteration in the quality of hemp seed on ripening.**] *Selek. Semenovod.* 1949. No. 5. 48-50.

Hemp ripens very unevenly: ripe grains appear first in the lower portion of the inflorescence, then in the middle, and finally in the upper part. The whole ripening process from the beginning to complete physiological ripeness lasts for 25 to 30 days. The highest economic yield of seed is obtained if the crop is harvested when the seeds in the middle part of the inflorescence are ripe.

With a heavy sowing the accumulation of oil in all varieties proceeds more rapidly than with a light sowing. With a late date of sowing, accompanied by more speedy progress through the stages of development by the plants, the accumulation of oil in the seeds proceeds more rapidly. The accumulation of organic substances in the seeds of Novo-Sibirsk hemp proceeded more intensively in the period 30 to 50 days after full flowering, and was accompanied by a sharp decline in husk. The iodine number of the oil in the process of ripening of hemp seeds rose as follows : on 10 August it was 157.03, on 20 August 158 and on 10 September 163.15.—R.P.J.

GROUNDNUT

Agronomy

224 BOUFFIL, F., and JEANDEL, P. Essais de culture de l'arachide en lignes jumelées à la Station expérimentale de l'Arachide de M'Bambey. [**Trials of groundnut cultivation in twin rows at the Groundnut Experimental Station, M'Bambey.**] *Agron. trop.* 1949. **4.** 311-8.

The natives of Senegal sow *Arachis* at a distance of 25 cm. along the rows, the rows being 50 cm. apart. This distance between rows does not allow weeding by mechanical means. The American machines at present are constructed for use among rows 67 cm. apart, at which distance a late weeding is still difficult. By further increasing the distance between rows, plant number and yield decrease. This article refers to trials in which *Arachis* was sown on rows 20 cm. apart, these groups of double rows being 80 cm. apart. Although the conditions of the experiment were not good (non-uniform soil and sowing delayed to the 20th of July) this system showed clear advantages, especially because it allows weeding until harvest time.—E.B.

225 GRANT, B. E. **Recommended practices for growing peanuts.** *Better Crops with Plant Food* 1949. **33.** 19-22 and 46-8. [Windsor, North Carolina]

Practical recommendations based on experience at North Carolina are :—prepare a good seed bed ; treat seed with Arasan ; plant between April 25 and May 10 ; try 2-foot rows with 6-in. spacing in the row for Bunch and 33 inch rows with 6-8 in. spacing for Jumboes ; manure according to results of soil tests ; where necessary, lime before planting and apply potash as the peanuts are cracking the soil ; cross cultivate to control weeds ; apply 400 lb. of gypsum or land plaster early in July to cover the row space where peanuts are developed ; apply sulphur or copper-sulphur dusts three times at 14-day intervals starting between July 1 and 15 ; stack the peanuts.—K.J.S.

Fertilizers

226 SAUGER, L., and GENUYT, G. Un essai de fumures de l'arachide (formule et dose d'un engrais NPK.) [**Trial of groundnut manuring (formula and dose of NPK fertilizer).**] *Agron. trop.* 1949. **4.** 301-10.

See *Soils and Fertilizers.*

227 BOUYER, S., and TOURTE, R. Contribution à l'étude de la fumure des terres à arachides du Sénegál. [**Contribution to the study of manures for groundnut soils in Senegal.**] *Agron. trop.* 1949. **4.** 266-300. See *Soils and Fertilizers.*

228 BOUYER, S. Croissance et nutrition minérale de l'arachide. [**Growth and mineral nutrition of groundnut.**] *Agron. trop.* 1949. **4.** 229-65. [Groundnut Experimental Station, M'Bambey, Senegal]

This article refers to studies on water absorption, elaboration of dry matter, and potassium, calcium, and magnesium, absorption. Growth processes take place in three phases, viz., initial phase of slow growth, phase of intense activity during which the vegetative organs develop vigorously, and a third phase characterised by fruit formation. From numerous observations made it is not yet known which characteristics are dependent on the cultural conditions of Senegal. However some facts of practical interest have arisen. An excess of water at the end of vegetation is harmful ; magnesium is important in the physiological processes of the plant ; it may be advisable to supply potassium, by means of NPK fertilizer in the middle of August (if sowing has taken place at the beginning of July) ; equilibrium of NPK in the plant should be controlled. —E.B.

FIBRE CROPS

FLAX

Agronomy

229 FRÖIER, K., and DANELL, N. Odlings- och beredringsförsök med spänadsväxter under år 1947. [**Cultivation and processing trials of fibre plants, 1947.**] *Lantbrukshögsk. Jordbr. Medd.* 1948. No. 27. 1-36. [English summary 34-6].

Figures for straw and grain yield and results of quality investigations conducted in the Flax Laboratory of the Swedish Seed Association at Svalöf are presented.

The most generally grown fibre flax variety in Sweden is Svalöf's Hercules (82.5 per cent of the acreage in 1947) followed by Concurrent from Holland (17.0 per cent) and Svalöf's Blenda (0.4 per cent). The advantages of Hercules are high straw yield and good quality. Concurrent gives less straw but larger yield of grain, the same results as regards long fibre, but more tow than Hercules. Blenda has good quality but is prone to lodging. The Irish variety Liral Prince is inferior to Hercules in straw and grain yield. The North American variety Cascade has given a good straw yield but has not proved superior to Hercules.

Phosphate manuring has not increased yield of straw or grain ; the same applies to long fibre and tow content. Potash manuring has been followed by a slight increase in yield, chiefly of straw. Contrary to results obtained in 1946, the application of granulated fertilizers showed no perceptible advantages in 1947. Rate of seeding trials confirms earlier experiences and indicates that a rate of 130-150 kg. per ha. gives the best results.

Weed treatment with sulphuric acid (3 per cent), dinitro-orthocresol and hormone derivative (Agroxon 0.5 per cent) was tested. The solution was sprayed at 1000 litres per ha. for all substances. An increase in straw and grain yields was obtained. The amount of long fibre was decreased by the treatments and its quality impaired. Sodium chlorate (Clorex) was tested to combat thistles and other perennial weeds in flax : it was applied in September/October. The crop was severely damaged owing to insufficient soaking of the soil.

In hemp, nitrogen, phosphate and potash fertilizers have given good results. Stable manure has proved particularly valuable to this crop. Granulated and drilled phosphate and potash fertilizers have caused an increase in straw and grain yield. Early sowing has given a higher grain yield and on the average the most satisfactory straw yield. Sowing in narrow drills and at the rate of 90-100 kg. seed per ha. would appear to be advisable from the point of view of yield and quality.

If all trials from 1944 to 1947 are considered, harvesting about 15 to 30 days after male flowering has proved most advantageous for yield and quality of straw. The largest grain yield has been obtained by harvesting 30 to 45 days after male flowering.—R.P.J.

230 TANDON, R. K. **The response of flax to rates and formulations of 2,4-dichlorophenoxyacetic acid.** *Agron. J.* 1949. **41.** 213-8.

Seven varieties of flax were treated with 2,4-D in three different forms (as ester, amine and sodium salt) and at three different rates (4, 8 and 16 ounces of acid per acre). This gave sixty-three treatments as well as twenty-one control plots, all of which were replicated four times. The plots were sprayed 1 month after sowing when the plants varied in height from 4 to 7 in. Characters studied were yields of grain and straw, date of maturity, bushel and thousand-grain weight, oil percentage, iodine number, seed viability and percentage of plots showing stem curvature.

Seed viability remained unaffected by treatments ; the amount of morphological abnormality, the delay in maturity and the reduction of final plant height were small enough to be unimportant at practical rates of application. In general, treatments caused reduction in the figures representing the remaining six characters (yields, weights and seed analysis) and in all but straw yield and bushel weight, varietal differences were observed. Of the seven varieties tested, Redwing, Koto, Dakota, and Sheyenne were relatively more tolerant than Crystal, B.5128 and Minerva, except that Dakota was less tolerant than B.5128 in oil content and percentage of plants showing stem curvature. At equivalent rates of application the sodium salt was generally the least injurious and the ester the most. Four ounces per acre of 2,4-D acid as sodium salt, amine and ester did not reduce the yield of tolerant varieties but did reduce that of susceptible ones. It is possible that lower rates of ester are just as effective for killing weeds and less likely to injure the crop.—R.N.H.W.

Seeds

231 FREDERIKSEN, P. S. **Germination of fibre flax seed injured by threshing.** *Proc. int. Seed Test Ass.* 1949. **14.** 144-69. [Danish Flax Res. Inst., Vilay J., Denmark]

Mechanical injury as the result of threshing or by adopting an excessively severe system of subsequent cleaning of the seed is defined in relation to types of seedlings in tests carried out at the above Institute. Mode of germination is evidently affected, and also the capacity of seeds to produce seedlings which do break through the soil and make normal growth. Seedlings which emerge abnormally appear unable to break through a covering layer of soil 2 cm. thick and are considered worthless. It is recommended therefore when making germination tests of flax seed, that only normally emerging seedlings should be counted as having germinated.—M.L.Y.

MANILA HEMP

Agronomy

232 Tammes, P. M. L. Over de cultuur van Manilla hennep in Indonesie. [**The growing of Manila hemp (*Musa textilis* Née) in Indonesia.**] *Landbouw, Buitenzorg* 1949. **21.** 103-14. [Makassar Branch, Gen. Agric. Exp. Sta., Buitenzorg, Java]

Efforts made from 1850 to 1860 and again from 1911 to popularize the growing of Manila hemp in Indonesia have had disappointing results except in north-east Sumatra, where a company has grown and processed the crop on a large scale. The initial material in this case was good, and it is probable that the lack of success in other parts of Indonesia has been due to the use of material from insufficiently good clones. The author gives information as follows. (1) Soil and climate. The soil must be permeable and fertile, preferably light lands such as are found at the foot of volcanoes and on river banks. Rainfall must be plentiful and evenly distributed throughout the year ; drought has a bad effect. The rainy lowlands would be the most suitable region. (2) The botany of *Musa textilis*. The fibre harvested comprises the outermost of three layers of tissue forming the leaf-sheath. (3) Fibre yield, expressed in percentage of the weight of the topped stem. Study of Indonesian material has shown the percentage (maximum 1.6, average 1) to be too low. In a clone imported from British North Borneo the percentage ranged from 2.14 to 2.66. (4) Varieties, with special reference to the Philippines. (5) Methods of cultivation. (6) Diseases. (7) Harvesting of stems (when the flower truss appears) and extraction of the fibre as practised in the Philippines, by small growers in British North Borneo and elsewhere, and on factory lines. (8) Production. The average for smallholders at Davao, Philippines, is 500 kg. fibre per ha. per year : a maximum of 3000 kg. has been obtained. This should be possible on good land in Indonesia. (9) Quality. (10) Possibility of promoting the culture in Indonesia.—G.M.R.

KENAF HEMP

Technology

233 Burkett, A. L., Gordon, E. D., Pettit, V. C., Pope, O. A., Walker, J. E., and Acuna, J. B. **Effects of age of plant and retting procedures on kenaf, *Hibiscus cannabinus* L., fiber.** *Agron. J.* 1949. **41.** 255-60. [Fibre Research Programme, Cuba]

Attempts to ret kenaf plants killed with cyanamide, 2,4-D, or kerosene or when allowed to die naturally were unsuccessful. Drip rotting (process described) gave unsatisfactory kenaf fibre. Field retting of cut plants produced fibre which was, however, not quite equal to that produced by tank retting or by mechanical decortication. Field retting occurs more rapidly during the rainy season than in the dry season. Plants 63 days old retted quicker than 84 and 105-day plants ; turning stalks in the field increased the speed of retting of the 84 and 105-day plants.—K.J.S.

COTTON

Varieties

234 Greece, Cotton Research Institute, Sindos. Sci. Bull. No. 2. **Cotton varieties for Greece, according to results obtained by the cotton Research Institute from 1932-1948.** By *B. G. Christidis*. [English summary 88-94.] 1949. pp. 94.

The work indicates that foreign varieties from the United States, Egypt, etc., with or without previous selection, are not suited to Greek conditions. The same applies to the upland variety Acala, which for many years has been grown rather extensively in Greece. There is only one exception. A number of selections from the American variety Carolina Foster may be of considerable importance when a demand for good quality cotton is developed.

The most promising strains are selections from local seed. At present *2Γ* is used more widely than any other, because it combines several good characteristics. Under somewhat adverse conditions 17χ and 2χ give higher yields, and if the amount of moisture in the soil is very high, variety 6χ17 is the best.

If quality does not appreciably affect the price of cotton, variety 14χ6 may be used with success. It gives up to 46 per cent of rather short lint. If, on the other hand, there is a demand for good quality cotton with an adequate premium in price, varieties 9χ8 and 9χ6 are indicated, besides the selections from Carolina Foster or 53*Δ*.—From author's conclusion.

Seeds

235 Christensen, C. M., Olafson, J. H., and Geddes, W. F. **Grain storage studies. VIII. Relation of molds in moist stored cottonseed to increased production of carbon dioxide, fatty acids, and heat.** *Cereal Chem.* 1949. **26.** 109-28. [Univ. Minnesota, St. Paul, Minn.]

Storage molds increased rapidly on and within cottonseed stored at relative humidities of 84 to 90 per cent for 10 days at 30°C. In general, the increase in mold population of the stored seeds was correlated closely with increased production of carbon dioxide and free fatty acids. Because of the peculiar structure of the seed coat, molds gain easy access to the interior of moist stored cottonseed where they grow vigorously and sporulate profusely, so that cottonseed may be extremely moldy without betraying any external evidence. Fungicides applied to the outside of the seed did not prevent rapid growth and sporulation of molds within the seed coat. Entire meats and hulls stored moist without a fungicide respired more rapidly, had a higher fatty acid content, and bore a larger mold population than similar fractions treated with thiourea. The evidence suggests that storage molds may play an important part in the deterioration of moist stored cottonseed.—Authors' abstract.

Technology

236 United States, Department of Agriculture. AIC. 216. **New developments in cotton—an old chemurgic crop.** By *W. M. Scott.* 1948. pp. 10. [Mimeographed] [S. Reg. Res. Lab., New Orleans, Louisiana]

It is recognized that if the cotton crop is to survive competition from synthetic fibres, new or improved uses may have to be found for the fibre and seed. Chemical research activities at the above Laboratory include (1) fundamental study of the structure of cellulose; (2) rot proofing cotton fabrics by a partial acetylation of cellulose to block the hydroxyl groups which are the site of microbial attack; (3) weather proofing, including a study of the factors light, wind, rain, etc. in degrading the cellulose fibre; (4) improving water resistance by utilizing the swelling powers of cellulose; (5) introducing amine or phenyl groups into the molecule to enhance the reactiveness of cellulose to dyes etc.; (6) improving and extending solvent extraction of cotton seed oil and removal of pigment glands from the meal; (7) preparation and evaluation of the deglanded meal for feeding purposes and of the pigment glands; (8) chemical treatment of cotton seed to improve its storage properties.—K.J.S.

Diseases and pests

237 United States, Department of Agriculture. E-772 Bur. Entomol. Plant Quarantine. **Experiments in early-season application of insecticides for cotton-insect control in Wharton County, Texas, during 1948.** By *K. P. Ewing, C. R. Parencia,* Jr. 1949. pp. 6.

The communities of Iago, Glen Flora and Five Corners suffered most damage from the boll weevil (*Anthonomus grandis*). The cotton fleahopper (*Psallus seriatus*) was the most damaging in the open prairie community, Danevang. A total of 6214 acres was dusted, using a 20 per cent toxaphene dust for the boll weevil and a 10 per cent toxaphene dust for the fleahopper. Neighbouring undusted communities served as controls.

The dusted cotton began fruiting heavily several weeks before the undusted cotton, maturing some 3 weeks earlier and having a 44 per cent increased yield over undusted cotton in boll-weevil infested areas. Puncturing was considerably reduced. In fleahopper infested areas the yield was 44 per cent above that of undusted cotton.—E.B.H.

238 Smith, A. L. **Soil fumigation for the control of cotton wilt and nematodes.** *Down to Earth* 1948. **4.** 12-3. [Alabama Agric. Exp. Sta.]

Striking results are illustrated in the growth of cotton in fields treated with ethylene dibromide tested to control cotton wilt in nematode infested soils of Georgia and Alabama. A dosage of 12.5 gallons per acre of Dowfume W-10 is recommended as being an economic dressing when used in conjunction with wilt-resistant varieties. Rowden did not respond to treatment with this comparatively low dosage.—K.J.S.

OTHER CROPS

BUCKWHEAT

Agronomy

239 ПЕТЕЛИНА, Н. Н. За высокий урожай гречихи. *Селек. Семеновод.* 1949. *No.* 5. стр. 63-4.

Petelina, N. N. [**To obtain high yields of *Fagopyrum esculentum***] *Selek. Semenovod.* 1949. No. 5. 63-4.

Trials conducted at the Alexandrov Government Plant Breeding Station are reported. The variety Kazanskaja was sown on two areas differing as regards manuring with mineral fertilizers, conditions otherwise being similar: on the "high mineral" area (application of NP before beginning of flowering) the increase in yield was approximately 3 centners per ha. (23.5 centners per ha. as against 20.7 centners per ha.). The same variety sown 4 days later on the same field on the "ordinary mineral" area gave a yield of only 15 centners per ha.

In 1949 the variety Ivanov was transferred for inclusion in the State variety trials. It was obtained by means of free cross-pollination of three varieties of a local mass selection; it possesses high resistance to drought, is thin-husked and surpasses the regional variety Kazanskaja by 1.7 centners per ha.

The aim of the Station is in the next few years to breed varieties of superior quality and surpassing the varieties Kazanskaja and Bogatyj in yielding capacity by 3 to 4 centners per ha.—R.P.J.

CROP BOTANY

PLANT PHYSIOLOGY

240 МИЛЛЕР, М. С. Влияние боковых побегов на формирование колоса у яровой пшеницы. *Доклады Акад. Наук СССР.* 1949. Том 67. *No.* 6. стр. 1151-4.

Miller, M. S. [**The influence of tillers on ear formation in spring wheat.**] *Doklady Akad. Nauk SSSR.* 1949. **67.** 1151-4. [Leningrad Agric. Inst.]

Culture experiments with Milturum 321 were designed to study the movements of substances within the plant by shading to prevent photosynthesis in the main shoot and in tillers. The tests started on 1st July when the plants had eleven or twelve branching stems and the eighth leaf had appeared on the main stem. Tillers limit the growth processes in the ear of the main stem and retard its development because of drawing off water and nutrient substances. The main shoot cannot utilize substances synthesized in leaves of the branches.—M.H.

241 АЛЕКСЕЕВ, А. М. и ГУСЕВ, Н. А. О влиянии фосфатов и нитратов на водный режим листьев пшеницы в условиях недостаточного водоснабжения. *Доклады Акад. Наук СССР.* 1949. Том 65. *No.* 6. стр. 911-4.

Alekseev, A. M., and Gusev, N.A. [**The effect of phosphates and nitrates on the water regime of wheat leaves under conditions of insufficient water supply.**] *Doklady Akad. Nauk SSSR.* 1949. **65.** 911-4. [Biol. Inst. Kazan Filial Acad. Sci., USSR.]

This type of study is of interest because the observations may indicate new ways of increasing drought resistance of crops by controlling the nutrient regime. In spite of this, work on this aspect has received little attention. Tests have therefore been made on the effect which several salts injected into the leaves of the wheat variety Lutescens 062 have on the water regime of the leaves in plants at the tillering and earing phases. There is evidence that the best results as regards increasing stability of the cell colloids are obtained by injections of phosphates at the tillering phase, and a similar effect is obtained at earing by injections of nitrate solutions. These findings conform with the theory of Krenke (*Herb. Abstr.* 15, Abs. 401) who maintained that phosphorus, which increases ageing, should improve resistance of young plants, while in old plants nitrogen should also stimulate resistance by retarding ageing.—M.H.

242 МАЦКОВ, Ф. Ф. О внекорневой подкормке растений. *Доклады Акад. Наук СССР.* 1949. Том 66. *No.* 4. стр. 733-6.

Mackov, F. F. [**Non-radical nutrition of plants.**] *Doklady Akad. Nauk SSSR.* 1949. **66.** 733-6. [Dokučaev Inst. Agric., Harjkov]

The experiments with spraying (once and three times) with 1 per cent solution of NH_4NO_3, KH_2PO_4 and KCl, and Hoagland's micro-element solution show definite but different responses in the test plants; cereals were much less responsive than potato or sugar beet. In all cases the effect of the NPK solution was much more pronounced and consistent than that of the micro-element solution.

Spraying with 3 per cent solution of N, and K, stimulated photosynthesis. The P solution in some cases showed depressing effect. The effect of the K solution on growth vigour was, however, lower than that of the P solution, thus showing a lack of any direct relation between the energy of photosynthesis and that of growth, as previously suggested by the author.

Spraying sainfoin plants during flowering with superphosphate solutions increased seed yield to a statistically signficant degree. Shedding of carpels was notably reduced.—M.A.O.

243 Torriani, Clara. Studi sull'anatomia protoplasmatica delle piante. La diversa sensibilità della radice e del fusto agli stimoli, la loro diversa partecipazione al ricambio idrico e la struttura del plasma. [**Studies on protoplasmic anatomy of plants. Different susceptibility to stimuli of the root and of the stem, their different participation in water exchange, and structure of the plasma.**] 1947. pp. 18. [English summary, 17] [Milano, Istituto Botanico dell' Università]

This study was carried out with *Pisum sativum*, *Lupinus albus*, and *Ricinus communis*. Plasma viscosity appears to be much higher in the roots than in the stem. This difference indicates that normally, in terrestrial plants, the roots are capable of storing and preserving larger quantities of water than the stem. This property is probably correlated with the presence in the plasma of mucoproteids, these compounds being capable of fixing large quantities of water in a stable form. This different structure of the plasma would also explain the different susceptibility of roots and stems to chemical and physical stimuli. Research was extended to plants living in different environments (from aquatic plants to xerophytes and halophytes) and some interesting conclusions are given. The quantity of mucoproteids in root and stem plasma of these ecological groups varies according to water balance.—E.B.

244 Gagetti, Adele. Studi sull'anatomia protoplasmatica delle piante. Ricerche citofisiologiche sull'ecologia della traspirazione. [**Studies on protoplasmic anatomy of plants. Cytophysiological researches on ecology of transpiration.**] 1947. pp. 31. [English summary, 30] [Milano, Istituto Botanico dell' Università]

Localization of transpiration in the different tissues of the leaf was investigated, and trials were carried out on plants belonging to different ecological types including *Phaseolus vulgaris*, *Glycine soja*, and *Convolvulus arvensis*. Results indicate that transpiration in the epidermis is very small because of the properties of the membrane; transpiration in the mesophyll is high but is controlled by the properties of the plasma, namely, by the presence of mucoproteids; the plasma of the mesophyll is more viscous than that of the epidermis; environmental factors which stimulate transpiration also cause an increase in viscosity and in water-absorbing capacity.—E.B.

245 Ghisleni, P. L. Effetto di ultrasuoni sulla germinabilità del grano. [**Effect of ultrasonic waves on wheat germination capacity.**] *Ital. agric.* 1949. **86.** 528-32.

In this series of trials wheat grains which had previously been soaked in water for 12 or 24 hours, were treated with ultrasonic waves for 1, 5 and 10 minutes. Results are summarized as follows: (a) the effect of ultrasonic waves appeared on the whole to be small; (b) the effect was more evident in the seeds treated for 10 minutes in which reduced germination power and energy was manifest; (c) reduction was higher in seeds in a more advanced state of germinative activity; (d) the grains which germinated after treatment showed a normal germination until the 8th day. The author believes that this reduction is caused partially by the increase of temperature due to the ultrasonic waves. —E.B.

246 Patron, R. R. Influencia de la temperatura y de la duración del día en el desarrollo morfológico de algunos trigos. [**Effect of temperature and of length of day on the morphological development of some wheats.**] *Rev. Fac. Agron. La Plata* 1948. **26.** 140-81. [English summary, 179-80.] [Diss. Univ. Wisconsin] [Chair of Plant Physiology and Phytogeography, Fac. Agron. Vet. Buenos Aires]

38 M.A., an Argentine spring wheat, Lin Calel M.A., an Argentine winter wheat, and Harvest Queen, a North American soft red winter wheat, were exposed to short day (8 hours of natural daylight, the plants being covered by a ventilated dark cage for the remainder of the 24 hours), long day (continuous illumination, natural daylight being lengthened by the use of 150-watt Mazda lamps over each temperature tank), and various combinations of air temperature (low or 16°C., medium or 20°C., and high or 24°C.) and soil temperature (8°C. and 12°C. in the low, 12°C. and 20°C. in the medium, and 16°C. and 24°C. in the high temperature house). Emergence of seedling, seedling growth, vegetative development, heading and maturation were studied, and morphological and physiological differences in responses were recorded in tables and graphs.

Differing varietal responses are described in the English summary. The difference in response of both the so-called winter and spring wheats from Argentina when compared with the North American winter wheat Harvest Queen suggests basic differences in both photoperiodic and temperature responses. The Argentine wheats appear to be intermediate in response between the spring and winter wheats of North America, Lin Calel M.A. more nearly resembling the spring type than 38 M.A., a so-called spring type.

Comparison of the seasonal change in hours of sunlight and periods of wheat sowing, growth and maturity of Madison, Wis., U.S.A., and Buenos Aires, Argentina, partly explains the different responses of wheat grown at these two localities. The winter and spring wheats of the main wheat area of the U.S.A. are adapted to two distinct photoperiodic and temperature combinations. In contrast, the Argentine spring and winter areas and periods of plant growth are relatively similar, both being in the short-day period with temperature differences showing the greater range.—From author's summary.—G.M.R.

247 Benson, E. G. and Murray, D. B. **A note on the effect of continuous light on the flowering of padi.** *Trop. Agriculture, Trin.* 1948. **25.** 3.

In Trinidad it is the practice of some Oil Companies to eliminate waste natural gas by leading it through a pipe and burning it at a height of about 30 ft. This produces a continuous bright flame, 6 to 8 ft. high, which is visible at night for many miles. In 1947 one Oil Company erected such a flare on the edge of a rice field. Most of the padis grown in Trinidad appear to ripen during the period of shortening days. It was evident that the light intensity of the flare at night was sufficient to upset the normal photoperiodic response of the plant, and to arrest the reproductive stages of flowering and fruiting, except in those areas of the field where the crop had been shaded from the flare at night. The effect was noticeable at least 300 yards from the flare, at which distance the light intensity must have been very low. At this distance even low obstacles cast long shadows in which padi was flowering normally.

As a result of this investigation, the Company readily agreed to extinguish the flare and once this was done, in early November, the padi rapidly came into flower and the crop was harvested some 4 to 6 weeks late.—EXTRACTS.

BIOCHEMISTRY

248 Agronomie Tropicale. Bibliographie concernant les vitamines du riz. [**Bibliography on vitamins of rice.**] *Agron. trop.* 1949. **4.** 418-20.

This bibliography includes 121 references.—E.B.

249 Shaw, A. C. and Pascoe, L. C. **Formation and distribution of vitamin C in the radicle and cotyledon of the broad bean (*Vicia faba*).** *Nature, Lond.* 1949. **164.** 624. [Skinners' School, Tunbridge Wells]

250 ЩЕРБАКОВ, Б. И. Влияние света различных спектральных участков на синтез витамина С в растениях. *Доклады Акад. Наук СССР.* 1949. Том 66. *No.* 6. стр. 1149-52.

Ščerbakov, B. I. [**The effect of light in different parts of the spectrum on synthesis of vitamin C in plants.**] *Doklady Akad. Nauk SSSR.* 1949. **66.** 1149-52.

The author is unaware of any work which is concerned with indication of the direct effect of different parts of the solar spectrum on vitamin C synthesis in green parts of the plant. Study was therefore made in the summer of 1947 with spring wheats (Erythrospermum 841, Marquis, and Hordeiform 0189) harvested in 1946.

There is confirmation that the stimulating action on formation of ascorbic acid in green parts of the plant is effected by those rays of the solar spectrum which play an active part in photosynthesis. In wheat seedlings tested it is concluded that the formation of ascorbic acid proceeds most intensively under white light. Of individual wavelengths, the red is most active in stimulating vitamin C; the blue/violet in the complex with azure and green is much weaker. The reducing activity of the plant tissues is most active in white light, and is somewhat weaker under red rays, while it is lowest under blue/violet.—M.H.

251 ДАРКАНБАЕВ, Т. Б. О содержании тиамина, рибофлавина и никотиновой кислоты в зерне пшениц Казахстан. *Доклады Акад. Наук.* 1949. Том 67. *No.* 4. стр. 695-7.

Darkanbaev, T. B. [**The content of thiamin, riboflavin and nicotinic acid in wheat grain of Kazahstan.**] *Doklady Akad. Nauk SSSR.* 1949. **67.** 695-7. [Kazah State Univ., Alma-Ata]

252 РАТНЕР, Е. И. и АКИМОЧКИНА, Т. А. Влияние катионов на некоторые внутриклеточные процессы в растениях в зависимости от источника поглощения этих катионов корнями. *Известия Акад. Наук СССР*, сер. биол., 1949. *No.* 3. стр. 296-315.

Ratner, E. I. and Akimočkina, T. A. [**The influence of cations on some processes within plant cells in relation to source of absorption of the cations by roots.**] *Izvestija Akad. Nauk SSSR*, Ser. Biol. 1949. No. 3. 296-315. [Timirjazev Inst. Pl. Physiol., Acad. Sci. USSR.].

253 Peat, S., Whelan, W. J. and Pirt, S. J. **The amylolytic enzymes of soya bean.** *Nature, Lond.* 1949. **164.** 499-500. [Univ. Coll. North Wales, Bangor]

The authors conclude that preparations of soybean enzyme which in the past have been used as sources of beta-amylase are, in fact, mixtures of a beta-amylase of the Balls' type and a factor Z which is probably an enzyme since it is heat-labile. The nature and function of the factor Z are at present unknown.—M.H.

254 БЕРЕНШТЕИЙ, Ф. Я. О биологической роли цинка. *Успехи Соврем. Биол.* 1949. Том 27. *No.* 3. стр. 407-20.

Berenšteiĭ, F. Ja. [**The biological role of zinc.**] *Uspehi Sovrem. Biol.* 1949. **27.** 407-20.

The work contains a table showing the content of zinc in whole plants (mostly cereals), plant organs and products, in mg. per 100 grm. dry substance.—M.H.

255 Mulder, E. G. **The microbiological estimation of copper, magnesium and molybdenum in soil and plant material.** *Anal. Chim. Acta* 1948. **2.** 793-800. [Agric. Exp. Sta. and Inst. Soil Res., T.N.O., Groningen, Netherlands]

A description is given of some microbiological experiments in the determination of copper, magnesium and molybdenum in soils and plant tissues. Some results obtained from the application of these tests are recorded.—Author's summary.

256 Rameau, J. T. B., Reith, J. F., and Deys, W. B. **Some investigations about the microdetermination of lead in plant material.** *Anal. Chim. Acta* 1948. **2.** 823-30. [Agric. Exp. Sta. T.N.O., Groningen (J.T.B.R.), Univ. Utrecht (J.F.R.), and Cent. Inst. Agric. Res., Wageningen (W.B.D.), Netherlands]

The need for a method of determining minute quantities of lead in plant material arose in connexion with a study of the so-called reclamation or copper deficiency disease.

The photometric determination of traces of lead by means of dithizone is discussed and described in detail. The method is rapid and suitable for serial analysis.—Authors' summary.

257 JAKOBEY, St. A mák, mint lecithinforrás. [**Poppy as a source of lecithine.**] *Agrártudomány.* 1949. **1.** 45-6. [English summary, 46.]. [Hungarian Oil-plant Breeding Station, Sneged]

After a short review of the present knowledge on phosphatides, the author presents data showing the various quantities of lecithine extracted from poppies by single solvents and mixtures thereof.—From author's summary.

258 SORGATO, I. Cellulosa ed altri componenti delle canne di sorgo. [**Cellulose and other constituents of sorghum canes**] *Industr. saccar. ital.* 1949. **42.** 214-8.

259 MUKHERJEE, R., and PARTHASARATHY, D. **Studies of the biological values of the proteins of certain poultry feeds.** *Ind. J. vet. Sci animal Husb.* 1948. **18.** 51-6. [Ind. Vet. Res. Inst., Izatnagar]

The efficiency of proteins of five cereals, namely, *Hordeum vulgare, Sorghum vulgare, Pennisetum typhoideum Eleusine coracana* and cheena [? *Panicum miliaceum*] was determined in experiments with adult cockerels. Nitrogen metabolism figures are given on a daily basis for each of the cereals. Evidence is presented to show that the the sum of uric acid nitrogen and ammonia nitrogen does not remain a constant percentage of the urinary nitrogen with all diets. Average biological values are given for each cereal and *P. typhoideum* proved highest in protein value, followed by *E. coracana* and barley, with *Sorghum vulgare* and cheena the poorest in protein content.—M.E.E.

260 PARTHASARATHY, D., and MUKHERJEE, R. **The manganese content of some common poultry feeds.** *Ind. J. vet. Sci. animal Husb.* 1948. **18.** 47-9. [Indian Vet. Res. Inst., Izatnagar]

A number of different cereals and their by-products were analysed for manganese content which was determined by a colorimetric method. Of the thirty-five substances tested, bran from *Oryza sativa* gave the highest manganese value of 156.0 ppm. followed by wheat bran (*Triticum vulgare*) with 101.1 ppm. *Pennisetum typhoideum, Sorghum vulgare, Hordeum vulgare* and polished rice were poor sources of manganese. Results of these experiments are compared with those found by other workers.—M.E.E.

261 DAVISON, Daphne C. **The distribution of formic and alcohol dehydrogenases in the higher plants, with particular reference to their variation in the pea plant during its life cycle.** *Proc. Linn. Soc. N.S.W.* 1949. **74.** 26-36. [Dept. Biochem., Univ. Sydney]

Of ninety-three species of plant seed from many genera examined by the Thunberg technique, formic dehydrogenase was found in fifty-four species and alcohol dehydrogenase in sixty-nine. All Leguminosae seeds examined (twenty-eight species) contained the formic enzyme in very active form ; its presence is independent of nodule bacteria. The formic enzyme is most active in the seed and decreases during growth to maturity. Activity of the alcohol enzyme follows a similar course ; the extremely active alcohol of dehydrogenase of nodular material is noticed.—K.J.S.

262 DAVISON, Daphne C. **The importance of formic dehydrogenase in the oxidation mechanisms of *Pisum sativum*.** *Proc. Linn. Soc. N.S.W.* 1949. **74.** 37-56. [Dept. Biochem., Univ. Sydney]

In a study of the oxidation mechanisms in plant metabolism, the possible paths of breakdown of formic acid to CO_2 and water in the pea seed and 7-day seedlings were investigated. As a result, a normal role in the first or dehydrogenation step of biological oxidation is assigned to formic dehydrogenase. Significant changes in enzyme activity on germination as revealed in inhibitor studies are described.—K.J.S.

263 BANZON, J., FULMER, E. I. and UNDERKOFLER, L. A. **Fermentative utilization of Cassava. The production of ethanol.** *Iowa St. Coll. J. Sci.* 1949. **23.** 119-35. [Iowa St. Coll.]

The plant is *Manihot utilissima.*

264 WYND, F. L., and NOGGLE, G. R. **Chemical composition of rye grown on different soil types in Ontario, Canada. Part I. Nitrogen content of the plants.** *Lloydia* 1949. **12.** 30-40.

Rosen rye was grown on five conspicuously different types of soils in the vicinity of Wallaceburg, Ontario. Two cuttings were made just before jointing occurred, and the percentage of total nitrogen was determined. The magnitudes of the following properties of the soils varied concomitantly : organic matter, nitrogen, base exchange capacity, total replaceable bases, replaceable calcium, and fraction 3 phosphorus. Each of the above soil properties was positively related to the percentage of nitrogen in the crops. Only those soil properties related quantitatively to the amount of organic matter exhibited this positive relationship.

If only saturated soils are considered, the determination of the base exchange capacity and the percentage of nitrogen probably would serve to determine the relative values of soils in the vicinity of Wallaceburg, Ontario, for the production of immature rye of high nitrogen content.—From authors' summary.

265 Wynd, F. L., and Noggle, G. R. **Chemical composition of rye grown on different soil types in Ontario, Canada. Part II. Distribution of nitrogen fractions in the plants.** *Lloydia* 1949. **12.** 41-9. [Mich. St. Coll., East Lansing, Michigan (F.L.W.) and Blandy Exp. Fm, Virginia Univ., Boyce, Virginia (G.R.N.).

Rosen rye was grown on five different types of soils, harvested just before the jointing stage and the tissue analysed for various nitrogen fractions. The fractions determined were total, insoluble, soluble, ammonia, nitrate, and nitrite, amide, amino and residual.

The ratio of the total nitrogen to the insoluble nitrogen diminished as the total nitrogen increased, while the ratios of the soluble nitrogen to the total increased, which showed that relatively more of the nitrogen was in the hot-water soluble fraction as the total nitrogen increased. Each of the ratios of ammonia, nitrate, and nitrite, and amide nitrogen to the total increased in magnitude as the total nitrogen increased, which showed that the relative percentages of nitrogen in these fractions diminished as the percentage of total nitrogen increased.

The ratio of amino nitrogen to the total exhibited no definite trend as the total nitrogen increased, which showed that the relative amount of nitrogen in the amino form did not vary consistently with increasing amounts of total nitrogen. The ratios of nitrate and nitrite, and of residual nitrogen decreased as the total increased, which showed that the relative amounts of nitrogen present in these fractions increased as the total nitrogen increased.

The data show that the feeding value of the nitrogen content of Rosen rye varies with different concentrations of total nitrogen. This situation is true, even if the nitrate and nitrite nitrogen be subtracted from the total. The application of the conventional protein factor, 6.25, to the nitrogen content of Rosen rye plants is not an accurate procedure for estimating the protein content of material containing widely different amounts of nitrogen. —From authors' summary.

266 Wynd, F. L. and Noggle, G. R. **Chemical composition of rye grown on different soil types in Ontario, Canada. Part III. Partition of soluble nitrogen in the plants.** *Lloydia* 1949. **12.** 50-5.

Rye grown on five types of soils near Wallaceburg, Ontario, was harvested just before the jointing stage and the concentrations of hot-water-soluble nitrogen were determined. The components of the soluble nitrogen fraction, nitrate and nitrite, ammonia, amino, amide, and residual nitrogen were also determined.

The concentration of each of the soluble components increased as the concentration of total soluble nitrogen increased. The concentrations of ammonia, amide, and amino-nitrogen relative to that of the total soluble nitrogen decreased as the total soluble nitrogen increased. The concentrations of nitrate and nitrite, and of residual nitrogen relative to that of the total soluble nitrogen increased as the total soluble nitrogen increased. These increases were logarithmic for the nitrate and nitrite fraction, and linear for the residual fraction.

The importance of the changes in the relative concentrations of the soluble nitrogen components as the percentages of total soluble nitrogen increases is discussed in relationship to the nutritional evaluation of young grass.—Authors' summary.

267 СТРОГАНОВ, Б. П. Влияние углекислоты на рост высших растений в период гетеротрофного итания. *Доклады Акад. Наук СССР*. 1949. Том 66. *No*. 4. стр. 741-2.

Stroganov, B. P. [**The effect of carbon-dioxide on the growth of higher plants during the period of heterotrophic nutrition.**] *Doklady Akad. Nauk SSSR*. 1949. **66.** 741-2. [Timirjazev Inst. Plant Physiol., Acad. Sci. USSR]

Two-day-old seedlings were grown 12-15 days in dark chambers supplied with a current of air either containing carbon dioxide or entirely free from it. Carbon dioxide on the whole affected elongation of the aerial and subterranean organs, but the response of the plants, and consequently the economic coefficient of the effects induced, seemed to depend upon the type of the substances stored in the endosperm and cotyledons. The plants with starchy (wheat) and oleaginous (sunflower) seeds responded to a lesser extent than the plants with albuminous (pea) seeds.

Carbon dioxide contained in the air affected the consumption and distribution among the organs of the stored substances. In some plants (wheat) the dry weight of aerial and subterranean organs was more or less equally increased ; in some others (pea) the dry weight of aerial organs increased more rapidly than that of the roots ; and in the remaining plants (sunflower) the dry weight of aerial organs was decreased and that of the roots increased. With an increase of carbon dioxide in the air, the economic coefficient was much more consistently increased in wheat than in pea, and in sunflower it was decreased.—M.A.O.

268 Tonzig, S., and Treccani-Poma, Cesarina. Studi sull'azione delle sostanze di crescita sopra il plasma vegetale. [**The action of growth substances on plant plasma.**] *Nuovo G. bot. ital.* 1947. **53.** 601-34. [English summary, 633.] [Milano, Istituto Botanico dell' Università]

Hypocotyls of *Ricinus* were stimulated with numerous substances and reactions observed. These reactions consist in an eventual bending or elongation of the hypocotyl and in modified properties of the cytoplasm. Of these properties, viscosity is the most important. Conclusions are briefly summarized as follows: increased viscosity of the plasma may not be accompanied by cellular expansion; the substances which have an action on plasma similar to that of auxins are always waste products of catabolism: heteroauxin is considered a waste product of lower plants; also all toxic substances stimulate cellular expansion; growth substances determine cellular expansion by acting both on the membrane and on the plasma which swells; these substances applied on one side only of the hypocotyl cause it to bend only if they are transported longitudinally; some substances (colchicine, xanthine, guanine, hypoxanthine, adenine) are transported transversely and cause the hypocotyl to elongate; cessation of growth in plant cells is not due to the fact that the plasma is no longer susceptible to stimuli but to modification in the membrane which cannot expand further. —E.B.

269 Chouard, P. Les progrès récents dans la connaissance et l'emploi des substances de croissance. [**Recent progress in the knowledge and use of growth substances.**] *Rev. Bot. appl.* 1948-9. **28.** 189-203, 316-27, 427-52, and 529-54. **29.** 138-56, and 252-96.

This review is completed by a bibliography including over 900 references which are grouped according to subject.—E.B.

270 Ferri, M. G. Hormônios e substâncias sintéticas promotoras ou reguladoras do crescimento das plantas. [**Hormones and synthetic substances promoting or regulating growth in plants.**] *Ciência Cultura* 1949. **1.** 75-84. [Dept. Bot., Fac. Fil., Ciencia e Letras, Univ. S. Paulo, Brazil]

This short, general account is based on the literature and arranged under the heads history, chemical nature of growth hormones, synthetic growth-regulating substances, and activity in relation to chemical structure. There are fifty-eight references, ranging from Charles Darwin, 1880, to the present day.—G.M.R.

271 Ditzler, L., Hunt, C. H., and Bethke, R. M. **Effect of heredity on the niacin and pantothenic acid content of corn.** *Cereal Chem.* 1948. **25.** 273-9.

Analyses for niacin and pantothenic acid were made on the inbred lines and single-cross hybrid components of four double-cross hybrids reported in an earlier study. The niacin content of both single- and double-cross hybrids appeared related to that of the inbred lines. It was more difficult to discern an hereditary influence on pantothenic acid, probably because of environmental differences.

Analyses of three inbred lines crossed in various combinations for the study of heterozygosity showed that the two vitamins may behave differently as to inheritance. Analyses of thirty-six samples from a group of early, uniform single-cross hybrids, involving nine inbred lines and all grown in approximately the same environmental conditions, showed a definite hereditary influence on both niacin and pantothenic acid.

The results in general confirm previous conclusions that the elaboration of both vitamins is influenced by hereditary factors but that the influence on niacin is less subject to modification by environmental factors than is the influence on pantothenic acid. It is suggested that the niacin content of corn can be increased by breeding.—Authors' abstract.

272 Harris, R. H., Sibbitt, L. D., and Banasik, O. J. **Effect of synthetic plant growth stimulants on some properties of cereal proteins and on mixogram patterns.** *Cereal Chem.* 1948. **25.** 255-66.

The concentration of alpha-sodium naphthyl acetate and sodium phenyl acetate was directly related to the percentage of total protein extracted from rye, wheat, barley, and millet flour, the percentage extracted decreasing in the order in which the cereals are named. The highest concentration of growth stimulant employed was 15.0 per cent, at which point the effect of concentration on percentage of protein extracted appeared to be approaching a constant. The effect of different stimulants on protein solubility varied; sodium naphthyl acetate had the greatest effect. This substance in relatively low concentration apparently tended to coagulate wheat flour protein dispersions in water, while at higher concentrations it increased the solubility of this protein. Sodium naphthyl acetate and 2, 4-dichlorophenoxy sodium acetate were very effective precipitating agents for 0.1 *N* acetic acid dispersions of gluten, removing approximately 98.0 per cent of dispersed protein at a concentration of 1400 mg. per 100 ml. of dispersion and greatly decreasing the relative viscosity. From the limited data collected, the final effect on solubility appeared to be independent of the individual stimulant employed.

The initial influence of stimulants on mixogram pattern of hard red spring wheat flours was to increase the strength of the curve ; but beyond a concentration of approximately 2.0 per cent of weight of flour used, a deleterious effect which increased with addition of stimulant was noticeable. Different wheat varieties were affected in the same manner.

It is apparent that synthetic plant growth stimulants have a marked effect on some properties of cereal proteins, and that this effect varies with the stimulant.—Authors' summary.

273 LAWS, W. D., and FRANCE, W. G. **A comparative study of some protein fractions of wheat flour.** *Cereal Chem.* 1948. **25.** 231-43.

An electrophoresis investigation of some protein fractions of flour from various wheats was carried out with the idea that it might reveal the presence of different protein components in the gluten complex. It proved impractical to study the proteins in either alcoholic buffers or in aqueous alkaline buffers with a pH of 10.2. Therefore attention was turned to the electrophoretic study of gluten proteins dissolved in acetic acid and dialyzed against citric acid-disodium phosphate buffer, pH 2.15. However, this procedure failed to reveal any significant difference in the flour proteins. Electrophoresis of the water extract of Chiefkan, Early Blackhull, and Comanche flours gave similar electrophoretic patterns for all flours.

Baking tests with flour fortified with wet and dry gluten washed from the various flours appear to confirm the results obtained by electrophoresis technique, namely, that the glutens from the flours studied are very similar in properties. When flour blends were fortified with wet, freshly washed gluten, the Chiefkan gluten gave the greatest increase in loaf volume and the Comanche the least for a given amount of protein added.—Authors' summary.

274 BAINS, G. S. **Effect of commercial fertilizers and green manure on yield and nutritive value of wheat. I. Nutritive value with respect to total phosphorus, phytic phosphorus, and calcium content of grain.** *Cereal Chem.* 1949. **26.** 317-25. [Punjab Agric. Coll. Res. Inst., Lyallpur, Pakistan]

Studies were made on the effect of potassium nitrate, superphosphate and superphosphate plus ammonium sulphate in doses of 25 lb. phosphoric acid (P_2O_5) and 60 lb. nitrogen per acre with and without green manure on the yield and nutritive value of wheat. The phosphatic treatments increased the yield by 38 to 48 per cent over the control. As the phytic phosphorus was found to be positively correlated with calcium content ($r = +0.74$), the nonphytic phosphorus content was taken as the criterion of nutritive value. The percentage proportion of nonphytic phosphorus to total phosphorus ranged from 23.4 per cent in grain of plots fertilized with superphosphate plus ammonium sulphate and green manure to 37.0 per cent in grain of the plots treated with superphosphate plus green manure. The availability of phosphorus as determined by *in vivo* experiments, however, exceeded the corresponding nonphytic phosphorus values by 27 to 32 per cent.—Author's abstract.

275 BROCKINGTON, S. F., DORIN, H. C., and HOWERTON, H. K. **Hygroscopic equilibria of whole kernel corn.** *Cereal Chem* . 1949. **26.** 166-73. [Quaker Oats Co., Res. Lab., Chicago, Ill. (S.F.B. and H.C.D.), Amer. Instrument Co., Silver Springs, Md (H.K.H.)]

The relative humidities of air in equilibrium with shelled yellow corn conditioned to moisture contents between 9.4 and 22.6 per cent were determined at 80° ± 0.2°F. with a new type of electric hygrometer. Moisture determinations were carried out with the Brown-Duvel apparatus as well as by a two-stage vacuum oven technique in which the second stage involved drying at 135°C. in a vacuum oven for 5 hours. The critical moisture content of shelled, yellow corn for safe storage, namely, that in equilibrium with a relative humidity of 75 per cent, was found to be 13.8 ± 0.2 per cent by the Brown-Duvel method and 14.7 ± 0.1 per cent by the two-stage vacuum oven technique.—Authors' abstract.

276 MARTIN, J. Het eiwitgehalte van voederbieten. **The protein content of fodder beet.** *Med. LandbHogesch. Gent* 1949. **14.** 111-8. [French, English and German summaries, 117-8.] [Govt. Sta. Anim. Nut., Ghent, Belgium]

From the analysis of 120 separately harvested and sampled fodder beets [mangolds], correlations were found to exist between (1) dry matter of the fresh sample and protein in the dry matter ; (2) protein and amides in the dry matter ; (3) protein and crude fibre in the dry matter ; (4) protein and magnesium in the dry matter ; and (5) protein and ash content in the dry matter. The results of the analysis are shown in graphs, and the practical importance of the conclusions, especially of the correlation protein/dry matter, is discussed critically.—From author's summary.

277 BELVAL, H., and DU MERAC, M. L. La greffe dans le genre *Helianthus*. [**Grafting in the genus *Helianthus*.**] *Bull. Mus. Nat. Hist. Paris* Ser. 2. 1947. **19.** 213-6.

The authors report on the results of chemical analyses of tubers, aerial and underground, produced by grafting sunflower on topinambour.—R.O.W.

278 Duym, C. P.A., Komen, J. G., Ultée, A. J., and Weide, B. M. v.d. **The inhibition of germination, caused by extracts of seedballs of the sugarbeet (*Beta vulgaris*).** *Proc. ned. Akad. Wet.* 1947. **50.** 527-35. [Bot. Lab. Univ. Utrecht, Netherlands]

Extracts of the seedballs of *Beta vulgaris* inhibited germination in *Avena sativa*, *Lepidium sativum* and *Papaver orientale*. In the authors' experiments no specific inhibiting substances could be detected. Osmotic effects were found to be more important. "Remarkable is the strong influence of light on the inhibition, which we cannot explain, but which also appears to be important in the case of inhibition by salt and sugar solutions."—G.M.R.

279 КРАМАРЕНКО, Л. Е. Бактерицидность клеточного сока как один из факторов обусловливающих сортовую устойчивость хлопчатника к гоммозу. *Доклады Всесоюз. Акад. С.-Х. Наук* 1949. *No.* 2. стр. 36-40.

Kramarenko, L. E. [**Bactericidal activity of cell sap as one of the factors conditioning varietal resistance of cotton to gummosis.**] *Doklady Vsesojuz. Akad. S.-H. Nauk* 1949. No. 2. 36-40. [All-Union Sci. Res. Inst. Agric. Microbiol.]

The following cotton varieties comprised the test material: OD-1 hybrid grown at the All-Union Select.-Genet. Inst.; 4943 from the Ukraine Cotton Station; 1306 and 13751 grown in the Odessa region; and Egyptian. The seeds were artificially infected with *Bacillus malvacearum*. OD-1 and 4943 were the most resistant, but complete immunity was not found in any. The most susceptible were Egyptian and 13751. The infection was greatest at the budding stage.

In order to analyse factors determining resistance, study was made of (1) thickness of the cuticle layer of the leaf, size and distribution of apertures, their number on the lamina; (2) pH of cell sap; (3) presence of specific antibodies in the cell sap; and (4) bactericidal nature of the cell sap. This last factor is apparently one of the fundamental characters affecting resistance, and the specific substance is of colloidal nature.—M.H.

MORPHOLOGY AND HISTOLOGY

280 Covas, G., and Schnack, B. El valor taxonómico de la relación "longitud del pistilo: volumen del grano de polen." [**The taxonomic value of the ratio of pistil length to volume of pollen grain.**] *Darwiniana* 1945. **7.** 80-90. [Received 1949] [Univ. Cuyo, Argentina]

The ratio "length of pistil: volume of grain of pollen", denoted R.P.P., is obtained by dividing the figure representing the maximum length to be covered by the pollen tube, expressed in microns, by the figure representing the volume of the grain of pollen, expressed in cubic microns. This ratio, within certain limits, is constant in each species and is more or less similar in systematically allied entities, for example, in the species of a homogeneous genus. The figure for R.P.P. is high in highly developed groups such as the Solanaceae, while it is comparatively low in the more primitive plants such as the Cucurbitaceae. R.P.P. can be of much value in elaborating phylogenetic systems of classification. The figure for R.P.P. is determined in 240 species belonging to sixty-eight families including many crop plants.—G.M.R.

281 Sass, J. E., and Eldredge, J. C. **Kernel morphology in lines of pop corn of diverse geographical origin.** *Proc. Iowa Acad. Sci.* 1947. **54.** 177. [Iowa State College, Ames, Iowa.]

Kernel morphology is described for White Hulless, Queen's Golden, South American and Tom Thumb lines. The suggested regions of origins are, respectively: Mexican plateau; Western Mexico; South America; Peruvian upland and Bolivia.—K.J.S.

282 Magee, Jean Anne. **The relation of histological structure to stalk stiffness in *Zea mays*.** *Proc. Iowa Acad. Sci.* 1947. **54.** 169. [Iowa State Coll., Ames, Iowa]

Stiff-stalked lines had a significantly wider rind, larger stalk diameters, and a low number of vascular bundles per square millimetre in the rind. The total number of bundles per stalk and the wall thickness of stem tissues did not show a consistent relationship to stalk strength (considered as a measure of resistance to lodging.).—K.J.S.

283 Sívori, E. M. Biología floral del girasol. [**Floral biology of the sunflower.**] *Rev. Fac. Agron. La Plata* 1946. **26.** 51-6. [Received 1949] [Suppl. Prof. Agric. Bot., Univ. La Plata]

A second, amended edition of an article originally published in 1941 (see *Herb. Abstr.* 12. Abs. 323. 1942). A general morphological description of the inflorescence of *Helianthus annuus* precedes an account of pollination. "Cross-fertilization is the general rule, promoted by the unequal emergence of the sexual organs." The agents of pollination are almost exclusively insects. The sunflower is, however, at least partially self-fertile, and artificial selfing is easily effected.—G.M.R.

284 Parodi, L. R. Espiguillas geminadas en *Avena barbata*. [**Twin spikelets in *Avena barbata*.**] *Rev. argent. Agron.* 1949. **16.** 50-1. [Prof. Bot., Univ. Buenos Aires and Univ. La Plata]

An abnormal inflorescence of *Avena barbata* found in 1948 is described and figured. Twin spikelets consisting of four decussate glumes and two racheae etc. are borne on the same pedicel.—G.M.R.

ECOLOGY

285 RAMDAS, L. A. **Some new instruments and experimental techniques developed in the Agricultural Meteorology Section at Poona.** *J. Sci. Ind. Res.* 1948. **7.** 16-29.

286 GILLMAN, C. **A vegetation-types map of Tanganyika territory.** *Geogr. Rev.* 1949. **39.** 7–37.

"We set out to classify vegetation by vegetation and not by anything else that may or may not be closely correlated with it. In leaving out questions of successional status we classify vegetation not by what it perhaps used to be, nor by what it will become according to some current theory, but by what the surveyor finds."

It is indeed a delight to find a vegetation map which has plain English words for nomenclature and avoids such doubtful terms as "veld" and "savanna."

The scheme in the map shows the following physiognomic vegetation types: (1) forest; (2) woodland; (3) bushland and thicket; (4) wooded grassland; (5) grassland; (6) permanent swamp vegetation; (7) desert and semi-desert; (8) vegetation actively induced by man. Each of these types is described and illustrated and gives the reader an excellent mental picture of the conditions when consulting the map itself. For those interested in "transzonal" topography—determined vegetational complexities the author gives a detailed description of the three catenas included on the map. Catena is defined as a distributional sequence of vegetation types determined by a given set of regularly repeated physiographic and/or hydrographic conditions (with their effect on soils), the arrangement of vegetation types being a function of local differences in topography that are constantly repeated over the catenary area."—P.M.

287 WIEHE, P. O. **The vegetation of Rodrigues Island.** *Mauritius Inst. Bull.* 1949. **2.** 279-305.

Considerable changes have taken place in the native vegetation of Rodrigues since its discovery in the 17th century and subsequent colonization. Communities of indigenous phanerophytes are almost extinct, and the changes which have taken place in the vegetation are described.

The island is of volcanic origin and more ancient than the other islands of the Mascarene group. A brief account of the physical features, soils and climate is given. It is unlikely that climate played an important role in the distribution of native plant communities. The Climax forest probably belonged to the "Tropical Dry Evergreen Forest" class of Burtt Davy with a high proportion of endemicity in its constitutent flora.

Exotic plant communities are described as well as their seral relationships and the factors favouring soil erosion.—Author's summary.

288 HANSON, H. C. **The agroclimatic-analogue (homoclime) technique in plant introduction and distribution of new selections.** *Agron. J.* 1949. **41.** 186-8. [Catholic Univ. of America, Washington, D.C.]

The study of the suitability of various geographic areas for the growing of crops has been pursued along two lines; first, the investigation of the environmental requirements of species and varieties, and second, the collection of environmental data in the area under study and making comparisons with other regions especially by means of classifications. In order to serve agricultural needs more fully the agroclimatic-analogue or homoclime technique, in which parts of these two methods have been combined has been developed for application to practical agronomic and horticultural studies. According to this technique similar ecological areas are delimited in different countries of the world by the comparison of all available climatic, geographic and edaphic data. This is followed by the growing of genetically homogeneous strains of plants in the delimited analogous areas for the purpose of securing phenological records for checking the delimitations which were made by the use of physical data alone. This technique aids in the selection of plants for introduction into a region and will facilitate the effective distribution of new strains.—From Author's summary.

PHYTOGEOGRAPHY

289 MIMEUR, G. L'origine du maïs. [**Origin of maize.**] *Rev. Bot. appl.* 1949. **29.** 366-77.

The wild ancestor of maize has not yet been identified nor has its geographical centre of origin been determined. The literature on the subject is reviewed and discussed.—E.B.

TAXONOMY

290 BOUFFIL, F. Variation dans la coloration des fleurs d'*Arachis hypogaea* L. [**Variation of flower colour in *Arachis hypogaea* L.**] *Agron. trop.* 1949. **4.** 319-20. [Groundnut Experimental Station M'Bambey, Senegal].

Two specimens from South America (Ecuador) grown at the Station have flowers of a different colour from those generally known, which are nostly yellow. These new varieties have orange or ink flowers, or they may be of an intermediate olour. The carina is always white. The author uggests a new diagnosis for the flower of this plant. The characters of the fruit do not permit these orms to be considered as species separate from *A. ypogaea*.—E.B.

291 TURMEL, J.-M., and BELVAL, H. Un cas d'hybridation spontanée entre *Helianthus* vivaces. [**A case of spontaneous hybridization in perennial *Helianthus***] *Bull. Mus. Nat. Hist. Paris* 1947. **19.** 2nd Ser. 217-23.
A report on the morphological and chemical glucosides) nature of an apparent hybrid between *H. tuberosus* and *H. doronicoides*.—R.O.W.

292 RODRIGO, América del P. Especies y variedades de "yute" espontáneas en el norte argentino (Tiliaceae). [**Species and varieties of jute growing wild in the north of Argentina.**] *Notas Mus. La Plata* 1948. **13.** Bot. No. 64. 273-89. 6 pls. [Dept. Bot., Museo de la Plata, Argentina]
Descriptions are given of *Corchorus argutus* with its varieties *prismatocarpa* and *longicarpus*, and *C. hirtus* with its varieties *orinocensis*, *pilolobus* and *argentinensis*, all of which grow wild in northern Argentina. *C. hirtus* var. *argentinensis* is a new variety, observed in the territory of Misiones.—G.M.R.

293 CHOPINET, R. Las especies cultivadas del género *Brassica*, sus relaciones genéticas y la nomenclatura moderna. [**The cultivated species of the genus *Brassica*, its genetic relationships and modern nomenclature.**] *Rev. argent. Agron.* 1949. **16.** 91-8. [Geneticist, Messrs. Vilmorin et Cie., Paris]
A Spanish version by J. La Porte of an article previously published in *Rev. hort.* N.S. 30. 435-40. 1947. The *Brassica* species are classified according to chromosome number and fall into two groups, the diploid and the polyploid.—G.M.R.

BOOKS AND PERIODICALS

94 UNITED STATES, Department of Agriculture. Misc. Publ. No. 665. **Agricultural geography of Europe and the Near East.** By *L. B. Bacon et al.* 35 × 27. pp. iv + 67. 66 maps or diagrams. Washington: U. S. Government Printing Office. 1948.
This up-to-date atlas of Europe and the Near East ncludes sixty-six maps and diagrams which show ot only the agricultural production and trade of he Continent but also a wealth of other geographcal information. A series of coloured maps emraces the physical factors of relief, precipitation, ngth of frost-free season, vegetation, and soils, nd these are accompanied by generous texts which xplain the relationship of these factors to crop and ve-stock production and to the economic life of the eople. In the section on population, urban and ural distributions are distinguished over the whole rea, but the proportions of industrial and agricultural populations are shown only for Europe exuding U.S.S.R. The land utilization section reognizes two principal regions, the first zone chacterized by summer rains and the second by ummer drought. The zone of summer rains covers orth-west Europe roughly north of the Pyrenees nd the Alps while the zone of summer drought inudes all the Mediterranean lands to the south.

The main section of this publication concerns he crop pattern of Europe which is substantially ifferent from that of other continents. Grain is the ading crop grown and wheat ranks first among the rincipal grains. The authors consider that acrege of crops is more stable than production and ffords a better comparison between commodities, so the dot distribution maps employed show acreages of the various crops. For wheat, however, yield and production are shown, as well as winter and spring wheat acreages. Other cereals mapped for distribution include rye, oats, barley, maize, buckwheat, rice and millet, and the production of citrus fruits, grapes and olives is shown for Mediterranean lands. Two important maps show the distribution of grassland and of forage root crops which are next to grain in importance in Europe as a whole. The live-stock industry section includes statistics of horses, mules, cattle, swine, sheep and goats and the distribution of these types of stock again bears a relationship to the two chief climatic zones. A concluding section deals with Europe's position in international agricultural trade. The most important crops are considered and in particular the integration between the United States and European markets is clearly demonstrated.—M. E. EDWARDS.

295 WEBERBAUER, A. El mundo vegetal de los Andes peruanos. Estudio fitogeográfico. [**The plant world of the Peruvian Andes. Phytogeographical study.**] 2nd, revised and enlarged edition. 1945. [Received 1949] 26 × 18. pp. xix + 776. 43 pls. Map in pocket. Lima, Peru: Ministerio de Agricultura, Estación Experimental Agrícola de la Molina. [Prof. Syst. Bot., Univ. San Marcos de Lima; Consulting Botanist, La Molina Agric. Exp. Sta.]
In this second, greatly enlarged edition of the book first published by Prof. Weberbauer in 1911 as Vol.

No. 12 of Engler and Drude's "Vegetation der Erde" series, a chapter (pp. 613-26) is devoted to the cultivated plants of Peru. Sugar cane and cotton, two of the country's principal exports, are produced in the coastal lands under irrigation. Rice for home consumption is grown in the north of the coastal region. A certain amount of maize is also grown. Above the coastal region, field crops are grown to altitudes of as high as 4200 m. in the south of Peru, in middle Peru to 4100 m. and in the north to 3500 m. Irrigation is as necessary in a large part of the highlands, especially the lower and middle altitudes of the west and the inter-Andean valleys, as in the coastal region, and the networks of straight watercourses accompanied by a narrow fringe of tree and shrub growth are visible from afar. Among the crops of the lower altitudes are cassava, rice, beans (*Phaseolus vulgaris*) and groundnuts. In the middle altitudes maize is the most important crop, followed by wheat grown at a slightly higher altitude. Still higher, where it is difficult or impossible to grow maize, barley (for grain and forage), quinoa (*Chenopodium quinoa*), *Ullucus tuberosus*, *Oxalis tuberosa*, *Tropaeolum tuberosum*, potatoes, peas, and beans (*Vicia faba*) are grown, and lucerne is the principal forage plant up to 3700 m., when it is replaced by barley. Some other cultivated plants and notes of their uses, botanical names, etc., are listed under A, those of American origin, and B, those of foreign origin, and finally altitude limits for all these plants are tabulated as recorded for the western slopes, inter-Andean lands, and eastern slopes of southern, middle and northern Peru respectively. Information is given in the earlier part of the book on the geography, climatology and natural plant cover of these regions.—G. M. ROSEVEARE.

296 FREAR, D. E. H. **A catalogue of insecticides and fungicides. Vol. II. Chemical fungicides and plant insecticides.** 27 × 20. pp. xii + 153. Waltham, Mass.: The Chronica Botanica Co.; London W.C.2.: Wm. Dawson and Sons, Ltd. 1948. $5.50. [A limited number of copies of Vols. 1 and 2, bound together in morocco and interleaved with blank paper, will be available shortly at $22.50.]

This compilation represents a portion of the work under Project 999 of the Pennsylvania Agricultural Experiment Station, begun during World War II in an effort to find new insecticides and fungicides to replace those made scarce by war restrictions on shipping and other disruptions of the normal flow of commercial materials. It was the opinion of the leaders of this project that before any concerted effort could be made to search for new pest-control chemicals, previous work in this field should be surveyed completely. This catalogue is a result of the survey. Covering as it does the results of biological testing on a group of approximately 10,000 materials, this work should be of wide use to scientists in the field of insecticides and fungicides. —FROM FOREWORD.

297 LÄGNERT, F. Veteodlingen i södra och mellersta Sverige. [**Wheat cultivation in south and central Sweden**] 25 × 18. pp. vii + 476. Lund: Carl Bloms Boktryckeri A.-B. 1949.

Preparatory work for this thesis from the Geographical Institute of the University of Lund was begun in 1944. The area treated has been divided into eight regions—I south-western Scania; II the south-east coast of Gotaland, with Öland and Gotland; III the south Swedish Upland; IV the west coast; V the Väner country; VI the Östgöta country; VII the Mälar country; and VIII the northern transitional region.

I. Agriculture in the south-western plain of Skåne in the middle of the 19th century varied in character in different parts of the region. Its development had proceeded furthest on both sides of a line extending from Lund to Trälleborg. In the following decades as the result of general, widespread improvement in soil fertility, wheat cultivation was extended, reaching its maximum in the south-west. Although the farms in the neighbourhood of Lake Mälar in Central Sweden are larger than those of the south-western plain of Scåne, the latter region was the first to grow wheat on a large scale commercially. Among the factors which have contributed to the increase in the growing of autumn wheat in the region have been drainage, earlier mechanization than in other parts of Sweden, application of artificial fertilizers on a large scale, early improvement of dairy methods, rotation of crops, and the improved varieties produced by the plant breeders at Svalöf. Since 1927 a marked decline has occurred in the growing of autumn wheat, particularly in the best cultivated areas in the south. This is due in part to the severe winters at the beginning of the present decade, in part to an increase in the cultivation of sugar-beet and oleiferous plants. II. Farming in the central and peripheral areas of Kristianstad followed the traditional pattern long after modern farming practices had been adopted in the south-western plain of Scåne. No appreciable increase in wheat cultivation occurred until 1905: the growing of this crop increased up to 1932 from when no change occurred until the second world war, when a considerable reduction took place, particularly in the central area. In Blekinge spring wheat is grown more extensively than autumn wheat. Öland and Gotland are old cereal-growing areas. In the middle of the 19th century the predominant crop on Öland was rye, but by 1880 the leading crop was wheat. The cold winters at the beginning of the present decade and an increase in the growing of vegetable crops have reduced the area under wheat.

About 1880 Gotland was one of the largest wheat-growing areas of Sweden: subsequently a continuous reduction occurred amounting to 50 per cent in 20 years. III. Owing to unfavourable soil and climate wheat growing has never played any great part in the south Swedish upland. IV. Spring wheat has always been of primary importance in the west coast region. In the cold winters at the beginning of the present decade autumn wheat disappeared in many areas. V. In the Väner country up to about 1905 the autumn wheat area remained practically unchanged. But in a few years an increase of 50 per cent occurred, the extension being greatest from 1913 to 1927. VI. Farming east of Lake Vätter is characterized by the large extent of the tillage area. This implies that wheat cultivation has played a more important role in Ostergotland and the Mäkar country than in the other parts of Sweden, with the exception of Skåne. About 1880 a great extension occurred in the growing of spring wheat in the Östgöta plain, with a considerable reduction in the autumn wheat area. By 1895, however, the spring wheat area had fallen to its former level. The area of autumn wheat cultivation expanded during the third decade of the present century, but in the following decades practically no expansion took place. The spring wheat area, formerly extensive, has now decreased. VII. The tillage areas in the Mälar country are generally speaking the largest in the country. The growing period is, however, 5 to 10 days shorter than in the Väner country. The autumn wheat area remained constant until 1925, after which time it fluctuated. In the third decade of the present century a considerable expansion of the spring wheat area occurred which continued until about 1939, when the area again began to contract. VIII. In the northern transitional area wheat cultivation is relatively unimportant, but some expansion has occurred during the last few decades. The winters are too severe for autumn wheat and the growing period is too short for spring wheat. As a result of plant breeding, however, varieties have been produced which make it possible to grow wheat much further north than has been done hitherto. The text is illustrated by a large number of graphs and diagrams, and three detached maps show the distribution of autumn wheat in 1913 and 1937, and of spring wheat in 1937.—R. PETER JONES.

298 HUTCHISON, T. **Machinery on the farm.** With a foreword by John Boyd Orr. 23 × 15. pp. ix + 198. London: Blackie and Son, Ltd. 1949. 17s. 6d.

Lord Boyd Orr in his foreword writes: "The author gives an historical account of the development of agricultural equipment, and brings the story up to date with illustrations and descriptions of the most modern machinery needed for all kinds of production. . . . This is a book written by a man who has had a long and expert experience of both agricultural engineering and practical farming. It will be read with pleasure and profit by all progressive farmers who realize that to-day mechanization is the key to efficiency in agriculture." The publication is in eight parts comprising: power; tillage implements; harvesting machinery; food preparing machinery; pest control; dairy machinery; care and maintenance; and machinery comes into its own (a consideration of design and developments). The author draws attention to the need for mechanization on the small farm. The demand for suitable equipment on the small and medium-sized farm is great, and it is claimed that manufacturers of equipment are alive to this position. An outstanding feature of the book is the number of clear illustrations, and there is a useful illustration index of machine types.—M. HALL.

299 WESTON, W. A. R. DILLON. **Diseases of potatoes, sugar beet and legumes.** 21 × 14. pp. viii + 86. London: Longmans, Green and Co. 1948. 4s.

This series of articles gives a straight-forward, easily assimilated account of the main diseases to which potatoes, sugar beet and legumes are susceptible. The onset, characteristic appearance and development of the depradations caused by insect pests and by parasitic fungi are described simply but unmistakably by word and diagram. The mode of infection is outlined, and the method of control indicated. The brief historical survey of the introduction of these crops into the country, and of the discovery and diagnosis of disease is both interesting and helpful. To the layman, farmer or student who require a concise and comprehensive, though not a highly technical account of this subject, this work will be of use.—A. D. HOOPER.

NEWS ITEMS AND SCIENTIFIC NOTES

International

300 A report of the FIRST INTERNATIONAL CONGRESS OF BIOCHEMISTRY held in Cambridge during 19 to 25 August, 1949, is contained in *Nature, Lond.*, 1st. Oct., 1949. The Committee of the Congress had called together an *ad hoc* International Committee, which drafted and adopted the following resolutions: (1) That after careful consideration of the invitations received from both France and Italy, it is unanimously agreed that the invitation of the Société de Chimie Biologique for the holding of the next International Congress of Biochemistry in Paris in 1952 be accepted. (2) That an International Committee for Biochemistry be now set up: (composed of eighteen members representing Australia, Belgium, Canada, France, India, Italy, Netherlands, Poland, Scandinavia, Switzerland, South America, the United Kingdom, and U.S.A., with two places kept for Russian members to be nominated by the appropriate authority. Chairman, Sir Charles Harington; Secretary, Prof. K. Linderstrøm-Lang.) (3) That this Committee be instructed to approach the International Council of Scientific Unions with a request for recognition as the international body representative of biochemistry, with a view to the formal constitution of an International Union of Biochemistry, as soon as possible.—M.H.

301 SEVENTH INTERNATIONAL BOTANICAL CONGRESS, STOCKHOLM, 1950. Argentine delegates to the Congress will include: Dr. Horacio R. Descole, Rector of the University of Tucumán and Director of the Miguel Lillo Botanical Institute, who has been nominated Hon. President of the General Assembly of the Congress; Professor Lorenzo R. Parodi, of the University of Buenos Aires, who has been nominated Vice-President of the Section for Phytogeography including Comparative Ecology; Ingr. Agr. Arturo E. Burkart, Director of the Darwinion Botanical Institute, San Isidro, who has been nominated Vice-President of the Agronomy Section; and Dr. Angel L. Cabrera, Head of the Division of Phytogeography in the Ministry of Agriculture's Institute of Botany and Professor of Botany in the Museum of La Plata, who has been nominated Vice-President of the Section for the Systematics of Phanerogams. *Rev. argent. Agron.*, June, 1949; and *Cienc. Invest.* July, 1949.—G.M.R.

Great Britain

302 PERSONAL. Dr. R. O. Whyte, who has been principally responsible for building up the Commonwealth Bureau of Pastures and Field Crops at Aberystwyth from its inception and who has directed it for 18 years, resigned in October, 1949, to take up the post of Principal of Research and Development with British Field Products Ltd., a new company concerned with developing crop drying in Britain. Dr. Whyte's successor as Director of the Aberystwyth Bureau is Mr. A. G. G. Hill, B.A., Agr.B., B.Sc., formerly Director of the East African Agricultural Research Institute, Amani, and after retiring from the Colonial Agricultural Service in 1947, Assistant Director of the Commonwealth Bureau of Horticulture and Plantation Crops at East Malling, Kent.

303 SUNFLOWER FACTORY OPENS. The first sunflower factory in Britain is starting production as a pilot plant on the Rogerstone Trading Estate, near Newport, Monmouthshire. The Jupiter strain of *Helianthus* gives the highest seed yields, the highest oil content and lowest husk ratio. *Fmr and Stk-Breed.* Sept. 1949.—S.D.

304 TO COMBAT WIREWORM. A new all-British seed dressing, "Mergamma", is to be available commercially. It is said to protect cereals against wireworm at a cost of about 12s. an acre. It contains 1 per cent of organically combined mercury to control soil and seed-borne diseases and a considerable percentage of gamma isomer of benzene hexachloride ("Gammexane") which protects the plant from wireworm. Over 200 trials with it have been carried out in Britain. At Newark, the yield of oats from an area not treated with Mergamma was 9 cwt. per acre, the treated area giving 17.5 cwt. per acre. Cost per acre of Mergamma was 12s., and that of ordinary organo-mercurial seed dressing, 3s. per acre. At present the dressing is effective only on cereals, but research into its possible use with sugar beet and potatoes is being carried out. *Fmr's Wkly* July 15, 1949.—S.D.

Finland

305 A NEW STORAGE BUILDING IN LOIMAA is being erected by the State grain supply authority. This will be the largest in the country and will comprise 18 grain silos, each 30 m. high and 5.7 m. in diameter. The storage capacity will be 11 million kg. grain. The cost is estimated at 110 million marks. It is hoped that the building will be completed by September, 1950. *Tidskrift för Lantmän.* October 1949.—R.P.J.

France

306 MAIZE PRODUCTION. The decrease in maize production under cultivation during the last 50 years (a reduction from 500,000 to 350,000 hectares) has been confined to the Garonne region. The introduction of American hybrids and the work now in progress under the direction of the Institut National de la Recherche Agronomique is giving a new impetus to extended cultivation over a far wider area. The chief problem will be to find the varieties best suited to the different environments. *C. R. Acad. Agric. France* March, 1949.—M.L.Y.

Hungary

307 SEED EXCHANGE. The Irrigation Experiment Station of the Centre for Agricultural Sciences at Budapest is anxious to receive varieties of all the plant species listed below, emanating either from irrigated lands or from high rainfall areas. The quantity of seed requested of each species is sufficient to sow an area of 200 sq. m. In return the Station offers the varieties enumerated below. Com-

munications should be addressed to the Centre for Agricultural Sciences, Budapest I, Attila-u. 53, Hungary.

PLANT SPECIES REQUESTED	OF THESE SPECIES THE FOLLOWING INLAND VARIETIES ARE OFFERED
Autumn wheat (*Triticum vulgare*)	Bánkuti 12ol, Bánkuti 1205, Fleischmann, Fleischmann M. Natvani 5612, Lovászpatonai 160, Székácsi 1055, Alesuti 21, Diöszegi 2, Eszterházai export, general, Eszterházai general.
Spring wheat (*Triticum vulgare*)	Perbetei awned, Perbetei awnless, Eszterházai U.
Rye (*Secale cereale*)	Fleischmann, Ovári, Lovászpatonai, Kisvérdai, Petkusi, Nagycenki M.
Rice (*Oryza sativa*)	Varsányhelyi, Omért 239, Szegedi 64, Omért 39, Bánlaki, Szegedi 35, 101, Omért 210.
Autumn barley (*Hordeum sativum*)	Béta 40, Mezóhegyesi 68, Hatvani.
Spring barley (*Hordeum sativum*)	Bánkuti fodder, Peresztegi 8, Diószegi malting, Pereszttegi 3, Hatvani malting, Taktaharkányi, Hanna, Mesterházai 193, Perbetei smooth.
Spring oats (*Avena sativa*)	Fleischmann, Lováspatonai white, Hatvani 187, Szekacsi 8.
Silo maize (*Zea mays*)	Bánkuti early dent corn, Bánkuti late dent corn, Mindszentpusztai white round corn, Pettandi golden rain, Fleischmann dent corn, Lovászpatonai early white, Lovászpatonai yellow dent corn.
Sugar beet (*Beta vulgaris* v. *saccharifera*)	Beta C. 242, Beta Y 19, Klein-Wanzleben, Maragis
Fodder beet or mangold (*Beta vulgaris* v. *crassa*)	Bábolnai yellow roller, Mauthner golden roller, Mauthner small roller, Monori red mammoth, Monori yellow oil berry, Monori greencrowned white, Bábolnai sweet fodder, Eszterházai red sweet fodder, Bödönháti.
(*Daucus carota*, *Brassica rapa*)	
Sunflower (*Helianthus annuus*)	Mauthner striped, Lovászpatonai.
Pea (*Pisum sativum*)	Diószegi Express, Monori Express, Diószegi Victoria, Monori Victoria.
Chickling vetch (*Lathyrus sativus*)	
Soybean (*Glycine hispida*)	Mauthner small-grained yellow, Mauthner Universal, Mauthner large-grained white, Mauthner golden yellow.
Common Millet (*Panicum miliaceum*)	Lovászpatonai giant
Wild cabbage (*Brassica oleracea acephala*)	
Sorgho for use as fodder (Sumac sorgo and *Sorghum saccharatum*)	
Flax (*Linum usitatissimum*)	Fleischmann fibre, Beta oilflax
Hemp (*Cannabis sativa*)	Fleischmann, Tiborszállási
Sorghum sudanensis.	

Spain

308 NATIONAL INSTITUTE OF AGRONOMIC RESEARCH. A short account is given in *Rev. argent. Agron.*, June, 1949, of this Institute in Madrid, founded some 10 years ago, which conducts its own research and supervises and co-ordinates the work of the various provincial stations studying regional crops and problems.—G.M.R.

Portugal

309 PORTUGUESE COLONIAL PRODUCTS. Greatly increased agricultural production is reported in the *Bulletin of Political, Economic and Cultural Information* for February, 1949. The cotton grown in Angola and Mozambique in 1947 totalled 27,000 tons, compared with 1200 tons in 1926. The textile industry in Portugal relies almost entirely upon these colonies for its supplies of raw cotton. Colonial vegetable oils, which in 1926 amounted to 33,600 tons, were brought up to 100,000 tons in 1948, Portugal thereby being rendered independent of foreign sources of supply.—G.M.R.

Cyprus

310 AGRICULTURAL DEPARTMENT. Before retiring from the position of Director of the Department of Agriculture, Mr. J. McDonald, has summarized the work done during the years 1938-48 in a special publication available from the Cyprus Government Printing Office, Nicosia 1949, entitled "Investigations and developments in Cyprus agriculture, 1938-48". All aspects of crop, forage and animal production are reviewed.—R.O.W.

North and South America

311 AGRICULTURAL CENSUS, 1950. All the countries composing the western hemisphere are preparing to carry out an agricultural census in 1950. A preparatory conference has been held in Mexico, attended by 58 delegates representing practically all the countries of America. The programme comprised a series of addresses on statistical methods, applied mathematics, theory of census making, etc., and practical work was done in the preparation of formulas to be used and in making an experimental census of a Mexican town. An account of the conference and a discussion of the census, with special reference to Colombia, is

given by A. Arbelaez Manrique, a delegate from that country, in *Agric. trop.* for January 1949.—G.M.R.

Australia

312 LUCERNE AND WATER TABLE. The furrow irrigation system followed at Lake Boga has caused the level of the underground water-table to rise to such an extent that orange trees are threatened. It has been discovered that by sowing the deep-rooting, perennial lucerne, the surplus summer water can be lessened and the rise of the water-table checked. Spray irrigation is now being established. This reduces the quantity of water used and the risk of seepage drainage to a minimum. *Commonw. Agricst* July, 1949.—E.B.H.

Indonesia

313 GENERAL AGRICULTURAL EXPERIMENT STATION, BUITENZORG. The organization and work of this Station (Algemeen Proefstation voor de Landbouw) is described by H. J. Toxopeus, Head of its Botanical Institute or Department, in *Landbouwkundig Tijdschrift* for July, 1949. The Station was established in its present form in 1926. It is a Government institution responsible for research into the agricultural problems of Indonesia generally, working in co-operation with the various regional and special research centres and laboratories and acting in a co-ordinating capacity. In addition, it conducts research in connexion with crops such as kapok, derris, etc., for which there is no special provision. It has twenty-six experiment fields situated in different parts of Indonesia at altitudes ranging from 5 to 1250 metres, and among the crops under trial are rice, maize, soybeans, cassava and kapok. At the Moeneng Experiment Field, only 5 m. above sea level, plants are tested for drought resistance.—G.M.R.

Argentina

314 TUCUMÁN, AGRICULTURAL EXPERIMENT STATION. The *Revista* of this Station for October-December, 1946, has just been received. It consists mainly of plans for reorganization.—G.M.R.

South America

315 FAO CONFERENCE ON STORAGE AND PRESERVATION OF GRAIN AND OTHER FOODSTUFFS. This Conference took place in the towns of Palmira and Cali, Colombia, from February 14th to 20th, 1949. Invitations were issued by F.A.O. and ratified by the Government of Colombia, which undertook the organization. In addition to the South and Central American countries, the following were represented: the U.S.A., Great Britain, the Netherlands, France, the Vatican. Canada sent an observer. *Agricultura Tropical*, the Colombian agricultural journal, contains in its 1949 issues short accounts of the organization of FAO (Jan. 1949), of the Palmira Conference programme (Feb. 1949), and of the papers presented (March and April, 1949). Recommendations of the London Conference of August, 1947, on the same subject are cited, including a call for an information service "such as that administered by the Imperial Agricultural Bureaux". The following papers were read. "The economic problem of infestation", by S. E. Easter of FAO, with special reference to insect infestation of stored grain. "The Losada-Figueroa survey plan," by B. Losada, Entomologist, Palmira Agric. Exp. Sta., which provided for a regional survey in Colombia, with the collaboration of some 150 agronomists, of the areas producing maize, rice, wheat and beans and of the insects found in regional samples of these crops. "Colorimetric methods of detecting insect infestation in grain", by J. C. Frankenfeld, of the U.S.A. Dept. Agric., describing a method in which the seal of the orifice made by an insect in oviposition, normally invisible, is stained while the grain retains its normal colour; the method is cheap, simple, and especially useful for millers. "Fumigation of grain on board ships in Brazil", by the Minister of Agriculture for Brazil, J. F. Rangel, a description of processes employed in 1946 and 1947. "Plan for the dissemination and co-ordination of knowledge on the protection of grain in Latin America", by A. Figueroa Potes, Entomologist, Fac. Agron. Valle. "Granaries in Cundinamarca, or the countryman's normal supply", by A. T. Villegas, Director of Agriculture for the Department of Cundinamarca, the principal maize-growing region of Colombia. This paper is reproduced in full. The regional climate makes insect attack inevitable. A large-scale construction of simple wooden granaries is proposed, combined with the use of insecticides, and educational work is planned. Under tropical conditions, the moisture content of grain for storage should not exceed 11.5 per cent. "Subterranean silos at Nueva Palmira, Uruguay", by J. J. Siecola of the Directorate of Agronomy, Uruguay, a paper describing a 550-ton capacity grain silo increasingly used in his country, the form being a trench 34 m. long, 8 m. wide and 3.40 m. deep, lined with a mixture of earth and cement, covered with Sisalkraft paper, straw, and finally a 2-metre layer of stamped earth. The silo is cheap, and it is claimed that the grain is perfectly conserved for several years. "The control of rodents and the storage of grain and foodstuffs," by H. J. Spencer, U.S. Dept. Interior, enumerated the control methods found most useful in the United States. "Colombian problems in the storage of grain", by C. Molina Garcés of the Secretariat of Agriculture, Valle de Cauca, in which the problem as it affects some tropical products such as plantain meal was also mentioned and a study of native products was recommended. "Physical aspects of grain storage" was discussed by J. A. Shellenberger of the U.S.A., and the "Conservation of stored coffee in Colombia," by R. M. Franco, of Colombia. "Economic research as a prerequisite of expenditure on grain storage," by T. E. Hall, U.S. Dept. Agric., was based on experience acquired in the United States. "Study of the conservation of foodstuffs in Colombia", by N. Obando of the Nat. Inst. Supply, Colombia, contained much statistical information and, in the second part, an account of experiments and steps taken to stimulate the construction of suitable stores for grain and potatoes. "Control of infestation of stored products in the United Kingdom", by E. E. Turtle, gave an account of the work of the Division for Pest Control of Stored Products in Great Britain, with special reference to technique. "The causes of heating in stored grain", by Lee Ling of FAO, summarized the results of research to date

and concluded by saying that, whatever the causes of spontaneous heating may be, the only efficient means of avoiding it is to dry the grain to a certain limit of moisture content, a limit which will vary in accordance with regional climatic conditions. The final conclusions of the Conference are listed in the March issue of *Agric. Trop.* for 1949. —G.M.R.

Peru

316 Oil Plants. The Institute of Cotton Genetics, Peru, has produced several strains of cotton which have good quality fibre, and seed with an oil content of over 25 per cent ; one strain, No. 1042, having an oil content of 29.4 per cent with a moisture content of 9.33 per cent. *Bol. Sem. Scipa Peru* No. 204. 1949.—G.M.R.

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FIELD CROP HUSBANDRY

LAND UTILIZATION AND MANAGEMENT

317 Valkenburg, S. van. **The World Land Use Survey.** *Econ. Geogr.* 1950, **26**, 1-5.

In 1949 the International Geographical Congress met in Lisbon and a committee was appointed to study the possibility of compiling a world inventory on land use. The author outlines the scheme evolved by the committee in which a survey of this type can be recorded on a uniform system of classification and notation.—M.H.

318 Darling, F. F. **Agriculture in the highlands and islands of Scotland II: The Hebrides.** *Brit. agric. Bull.* 1949, **2**, 353-9, illus.

Particular reference is made to the calcareous grasslands or marchair. Here, barley and potato cultivation is important, though it is now being replaced by the cultivation of bristle pointed oats, *Avena strigosa.*—S.D.

319 Smith, Helen L. **Agricultural land use in Iowa.** *Econ. Geogr.* 1949, **25**, 190-200.

By means of statistics worked out in maps, this study shows some fundamental aspects of geography of the State. County figures from the Sixteenth (1940) Census Report on Agriculture were used in making maps showing major land use patterns. The maps on which this study is based portray the extent and relative importance of certain crops. Iowa, lying mostly in the Corn Belt, is fairly homogeneous and probably shows less local variation in physical environment and in the corresponding land use pattern than other Corn Belt States.—Adapted extract.

320 Sommers, Marjorie S. **Wheat producing areas in Peru.** *Econ. Geogr.* 1949, **25**, 13-6.

Wheat forms one of the principal subsistence crops of Peru and statistics of its growth are issued. The present paper consists chiefly of a dot map showing the distribution of the wheat-producing areas, each dot representing 200 acres under wheat, according to the Peruvian census of 1940. The producing zone is found mainly between 7000 and 13,000 ft. a.s.l. In these highland regions it is grown on slopes as steep as 45 degrees.—M.E.E.

321 Chary, D. D. **Irrigation and land use in Zeiniya Bahari, Upper Egypt.** *Geogr. Rev.* 1949, **39**, 568-83. [Univ. Michigan]

The agricultural pattern in Zeiniya Bahari points to the close relationship between specific irrigation techniques and land-use practices. Behind both lies the determining influence of the Nile, not only as a source of water but also as a regulator of seasonal activity. Following the annual Nile flood, there is intense activity in both the basin area and the perennially irrigated area. As the season advances, the water supply decreases, curtailing agricultural production. The basins yield mostly only one crop during the year. In the perennially irrigated area the land may be in use when the basins are submerged, and two crops per annum may be obtained. In both areas there is little agricultural activity in the summer because of the low state of the Nile.—From author's summary.

322 Sagot, A. Situation actuelle de l'agriculture en Afrique Occidentale Française. [**Present situation of agriculture in French West Africa.**] *Rev. Bot. appl.* 1949, **29**, 159-62.

The groundnut harvest in Senegal for 1947-48 reached 436,000 tons of unshelled nuts (100,000 tons higher than the previous harvest). An area of 10,000 ha. at Kaffrine is to be cultivated mechanically as a pilot experiment before undertaking the cultivation of 200,000 ha. in the Kolda, Kaffrine, Koungueul and Nioro districts. Varieties for this project are being selected at the Bambey Experimental Station. Rice production is about 500,000 tons but 80,000 tons more are to be imported to meet internal demand. A policy of water regulation has been followed for several years in Guinea, the French Sudan and the Niger Colony which has increased food production in the valleys of the Niger and of its tributaries. An experiment station for rice cultivation is to be established at Kankan, French Guinea. A brief account of mechanization and agricultural instruction is given.—E.B.

323 Netherlands, Ministerie van Landbouw, Visserij en Voedselvoorziening. Indeling der gemeenten gerangschikt naar de landbouwgebieden. [**The parishes of the Netherlands classified according to the agricultural regions.**] 2nd, revised edn. 1949, pp. 19, 1 col. map.

Seven regional types of land are distinguished in the Netherlands; namely, the sea clays, the river clays, the loess lands, the pasture lands, the sand lands, the peat lands, and the dunes. The municipalities and parishes are listed according to these divisions and the classification is illustrated by a coloured map. The publication is helpful for an understanding of the distinct types of farming governed by the regional conditions.—G.M.R.

324 GIORDANO, B. Per l'intensificazione del l'agricoltura nella piana di Sant'Eufemia. [**More intensive agriculture on the plain of Sant'Eufemia.**] *Humus, Milan* 1949, **5**, No. 11, 21-4.

Land reclamation of the plain of Sant'Eufemia (Calabria) started 20 years ago and is now almost completed. On an area of 34,000 ha. afforestation, masonry and irrigation works, etc., have been carried out. Further work is scheduled. The land is divided into properties which are mostly under 3 ha. It is calculated that three-quarters of the zone are already under intensive agriculture, and that further development will be achieved by extending irrigation.—E.B.

FARMING SYSTEMS

325 UNITED STATES, Department of Agriculture Misc. Pub. No. 670. **Irrigation agriculture in the West.** 1948, pp. 39.

A policy of expanding irrigation agriculture is being pursued by the Department and this publication shows how this policy can best be achieved in those seventeen Western States where irrigation is the essence of agricultural production.—M.E.E.

326 EGUIRAUN, J. de Rotación de cultivos. [**Rotation of crops.**] *Agric. venez.* 1949, 13, No. 134, 14-17.

A 2-year rotation including maize, potatoes, sesame, tobacco, beans and *Crotalaria* is planned to suit Venezuelan conditions. The beans are harvested, the *Crotalaria* is ploughed in.—G.M.R.

CONSERVATION PRACTICES

327 SINGH, R. N. **Reclamation of "Usar" lands in India through blue green algae.** *Nature, Lond.* 1950, **165**, 325-6. [Bot. Dept., Benares Hindu Univ.]

In view of the vast area occupied by alkaline "Usar" lands, reclamation by the method suggested promises to be of great value to Indian agriculture.—M.H.

ECONOMICS OF CROP PRODUCTION

328 CAMBRIDGE UNIVERSITY, Department of Agriculture. Farm Economics Branch. Rep. No. 37. **A survey of the cost of producing sugar beet in three districts in the Eastern Counties. 1948.** 1949. [Mimeographed]

Sugar beet occupied 12, 13 and 18 per cent respectively of the arable land in the three districts of Ipswich, Bury and Ely. The wet summer gave heavy crops on the boulder clay of the Bury district, and the dry winter was good for harvesting. The beet acreage has increased progressively between 1939 and 1948 in Suffolk. Crops are usually poor after a dry season on the light soils of the Ipswich area, but yields were good in 1948. On the Ely fen soils the acreage of beet has declined in recent years probably due to eelworm infestation. In all districts beet was usually sown after wheat, barley or oats, though in the Ely district it was most frequently found after potatoes or wheat. In the Bury and Ipswich districts the beet crop was often followed by barley, and in the Ely district by wheat or potatoes. Costs of producing sugar beet varied between £35 and £38 per acre and receipts between £62 and £68 an acre. Though all items of cost show a fairly constant increase over the 1946 records, yields were exceptionally heavy, except for some farms in the Bury district, and ranged from 9 to over 15 tons per acre, so that the 1946 yields were surpassed, and substantial increases in profits recorded. Sugar content was 17.5 per cent in both the Bury and Ipswich districts, and 14.8 in the Ely fens.—A.D.H.

329 NEBRASKA Agricultural Experiment Station. Bull. 391. **Cost of operating machinery on Nebraska farms.** By *F. Miller, Q. W. Lindsey* and *A. G. George*. 1948. pp. 35.

This report is mainly statistical and deals with the cost and performance for a wide range of farm equipment. It is intended to serve as a guide for farmers who may wish to estimate the cost and performance per acre or per hour for new equipment compared with old. A formula for estimating the rate of work is given as well as useful information on the range in costs associated with varying hours worked per year.—T.G.J.

330 KENTUCKY Agricultural Experiment Station. Bull. 521. **Systems of farming for the Lower-Ohio valley, crop-livestock region of Kentucky.** By *G. B. Byers*. 1948. pp. 52.

This study is concerned with the analysis of the farming area into types and with practical proposals for raising the productive efficiency of the three types enumerated. The yields of corn on the three types were 53, 45 and 40 bu. per acre respectively. Yields of wheat were 22, 21 and 20 bu. and yields of barley 30, 50 and 35 bu. on the three types. Test demonstrations of the TVA showed increased yields from the application of limestone and phosphate to wheatland. Grass and legume hay crops were increased 30 to 40 per cent through limestone and phosphate. On land in Area A the general rotation in recent years has been corn/corn/soybeans. The effect on corn yields has been beneficial. On Area B farms the rotation tended to be longer, with corn predominating, but it included a temporary ley or pasture. The undulating land in Area C was responsible for a further lengthening of the rotation. Details are given of the increased yields to be expected by revised farming systems and it is claimed that wholesale adoption of the proposed systems might well return a labour income (at 1939-41 average prices) six times greater than that returned by the typical systems in use in 1940.—T.G.J.

CROPS IN GENERAL

Agronomy

331 KUDRJAŠEV, V. M., and MALYGIN, Ju. N. [**Mixed sowings of narrow-leaved lupin and oats for seed.**] *Selek. Semenovod.* 1950, **17**, 35-9. [Russian]

Good results have been obtained by sowing together Novozybkovsk 173 lupin and Dunn oats. Sowing is carried out in early spring. To the usual norm of oats is added 0.5 centners per ha. of viable lupin seed. The crop is cut with a reaper and left in the field for from 7 to 10 days for thorough drying and ripening of the lupin seed. Threshing of the mixed grain is carried out in the ordinary way, care being taken to avoid crushing the lupin seed.—R.P.J.

332 CANEL, M. La influencia de la sequia del año 1942/43 sobre el rendimiento del girasol y maíz. [**The effect of the drought of 1942-43 on the yield of sunflower and maize.**] *Arch. fitotéc. Uruguay* 1949, **4**, 10-12. [Inst. Fitotéc. La Estanzuela, Uruguay]

From the middle of September 1942 to the middle of March 1943, Uruguay suffered the severest drought experienced for 50 years. An account is given of irrigation experiments conducted during this period, with three varieties of maize and one of sunflower. Sowings were made on September 18, November 3 and December 21; water was applied from the time of germination onwards in increasing quantities, a maximum of 300 to 350 mm. per month being reached in the months of January and February. Results, tabulated and discussed, are concerned with: the height of the plants; the date at which the male inflorescence, the stigmas and pollen respectively appear; grain yield and number of plants; percentage of grain (a) in the plant and (b) in the cob; the development of the maize cob (length, number of rows); cobs per plant; thousand-grain weight; and (in the sunflowers) percentage kernel in seed. Findings which emerge are: that sunflower is more resistant to drought than maize; that Colorado was the most resistant of the maize varieties tested; that although the stigmas of maize emerge earlier as a result of irrigation, the pollen appears later, and the duration of the pollination period (number of days from the beginning to the cessation of pollination) is shorter in the irrigated plants. This difference in the date of appearance of the stigmas and pollen respectively is so characteristic that it can be taken as an index of the sensitivity to drought of individuals within the same variety. Breeding for drought resistance based on this character is now in its sixth year at La Estanzuela and gives promising results.—G.M.R.

333 MONTOYA, D. G. Las horas diarias de luz solar y sus efectos sobre algunas plantas tropicales. [**Daily hours of sunshine and their effect on some tropical plants.**] *Rev. Agric., Puerto Rico* 1949, **39**, 181-4, bibl. 7.

The literature, including accounts of work done at the Puerto Rico Agricultural Experiment Station, is reviewed and it is concluded that although in Puerto Rico there is little variation during the year in the number of hours of daylight, several of the regional economic plants are sensitive to the slight fluctuations which are recorded. This indicates the importance of selecting varieties adapted to the local conditions and may explain the failure of certain plant species and varieties of great value in other countries.—G.M.R.

Varieties

334 VEENBAAS, A., SCHEIJGROND, K., and POLL, K. J. Enkele resultaten van het onderzoek van aardappel-, peulvruchten- en gerstrassen op hun consumptiewaarde. [**Some results from a study of the consumption value of potato, pulse, and barley varieties.**] *Versl. Cent. Inst. Landbouwk. Onderzoek.* 1949, **1948**, 91-4. [Cent. Inst. Agric. Res., Wageningen, Netherlands]

A report on the colour, taste, and suitability for cooking of the varieties of peas, beans and barley most commonly grown in the Netherlands. The commonest barley variety, Kenia, was considered of moderate value only; Mansholt's two-row was among the best, although the blue colour of the raw barley is a drawback. The new variety Selecta is second on the list and Saxonia also takes a good place.—G.M.R.

335 HAMMING, G. Het samenvatten van rassenproeven en het toepassen van vruchtbaarheidscorrecties met niet-orthogonale methoden. [**The summarizing of varietal trials and the application of fertility corrections by non-orthogonal methods.**] *Versl. landbouwk. Onderzoek.* 1949, No. **54, 19**, pp. 198. [English summary, p. 198.] [Inst. v. Rassenonderzoek v. Landbouwgewassen, Wageningen, Netherlands]

Some problems encountered in the mathematical treatment of field trial results are discussed in the chapters (1) some general conceptions; (2) some peculiarities of the varietal trial; (3) the summarizing of varietal trials; and (4) the calculation of fertility corrections in individual trial fields.

One problem is that of making corrections with regard to fertility variations. Graphical methods appear to be better than those of R. A. Fisher and his school, especially when many varieties are studied in fields without sub-blocks, but when graphical methods are employed there is usually no control on the graphs. In Chap. 4 some control methods are suggested as well as a way of estimating the mean error.

Another problem is the finding of a method of combining the results of trial fields containing different numbers of varieties. Because in this case the varieties are not orthogonal to the trial fields, the Fisher method cannot be employed here. In Chap. 3 another method is suggested. The areas to which conclusions are applied are not homogeneous, and soil properties vary from place to place. Every variety has its special reaction to these varying properties, but sometimes two or more have approximately the same reaction. Such varieties are therefore interdependent. Much of Chap. 3 treats the mathematical difficulties arising from this interdependence. A provisional solution is given, but without a theory of errors. The first two chapters deal with conceptions used in the last two chapters. In Chap. 1 special attention is given to the difference between systematical and accidental errors, and to the difference between correlation or co-variation and linear adjustment; and in Chap. 2 to the assumption that the production of a variety in a trial field may be considered as the sum of a contribution of the variety and a contribution of the trial field. [See also *Fld. Crop Abstr.* 1. Abs. 870.]—From author's summary.

336 PAATELA, J. Eräiden ristiisittoisten viljelykasvien jalostuksesta yhdysvalloissa. [**On the methods used in breeding some open pollinated crops in the United States.**] *Maataloust. Aikakausk.* 1949, **21**, 148-61. [English summary p. 161.] [Agric. Res. Inst., Dept. Plant Husbandry, Tikkurila]

Seeds

337 ANDREN, F. Vårutsädets betningsbehov och betningsmedel. [**Spring seed grain's disinfecting requirements and disinfectants.**] *Lantm. Svenskt Land* 1950, **34**, 210-1.

Directions are given for disinfecting seed of barley, oats, wheat, flax, hemp and rape.—R.P.J.

338 LENIGER, H. A. De technologie van het drogen van graan. [**The technology of grain drying.**] *Landbouwk. Tijdschr.* 1949, **61,** 697-710.

The subject is discussed under the heads: (1) initial and final water content of the material; (2) admissible drying conditions (duration of heating with special reference to the water content of the material); (3) rate of drying (in kg. per kg. dry grain per hour, also in reference to the water content of the material); (4) choice of method (infrared radiation and high frequency treatment are considered unsuitable, and the choice lies between air drying under atmospheric pressure and vacuum drying); and (5) different types of drier operating with air under atmospheric pressure. The last-named section occupies a large part of the article, and it is remarked that there are no technical difficulties in the designing of a good grain drier, but insufficient reliable knowledge is yet available concerning admissible conditions of drying, rate of drying, air resistance, etc. It is desirable that this gap should soon be filled.—G.M.R.

339 AGRICULTURAL ENGINEERING RECORD. **Moisture content of combine harvested grain.** *Agric. Engng Rec.* 1949, **2**, 214-5.

Results obtained on four farms in Bedfordshire using the Carter Simon oven method of determining moisture content are reported. A total of 213 samples was taken, representing about 1000 tons of grain. Total rainfall distributed over 18 days averaged 2.82 in. Wheat, barley, oats and mixed corn with different moisture contents were divided into percentage weight groups as follows:—under 14 per cent, when grain is considered fit for prolonged bulk storage; 14 to 15.9 per cent, for temporary storage; 16 to 17.9 per cent, for winter storage in sacks; 18 to 19.9 per cent, for temporary sack storage; and six groups over 20 per cent when grain requires drying within a few days. Little more than half of the total grain contained less than 20 per cent moisture, and more than three-quarters 16 to 22 per cent. The largest proportion registered 16 to *22* per cent moisture content.—M.L.Y.

340 AGRICULTURAL ENGINEERING RECORD. **Grain drying and storage on the farm.** *Agric. Engng Rec.* 1949, **2**, 200-1.

The increase in the use of combine harvesters in the United Kingdom during the past 10 years has raised the question of drying facilities. There is no indication that the moisture content of windrow harvested grain is lower than that from direct combine harvesting. Cleaning grain from a weedy crop provides a means of reducing overall moisture content and is a precaution against mould growth. Reference is made to the capacity of a ventilated bin plant. Although running costs are less than those of a hot-air drier with separate storage bins, capacity limitation must be considered. Designs dealing with 400 tons should be possible, but beyond this limit, management and control of bins would be complicated. For large acreages where the average moisture content is above 22 per cent, the continuous hot-air drier seems to be the satisfactory alternative. On smaller farms, the automatic drier would solve the problem. Drying grain in sacks placed horizontally over a duct, so that hot air is forced through the grain, is being tested at Silsoe.—M.L.Y.

341 BORZINI, G. Concia delle sementi contro la carie. [**Seed treatment to control bunt.**] *Humus, Milan* 1950, **6**, No. 3, 20-2.

General information on seed treatment to control diseases is given, with special reference to *Tilletia* spp. on wheat. In this connexion comparison is made of copper compounds, organic mercury compounds and non-metallic organic compounds.

In the case of hidden injuries being present in the seeds following mechanical threshing, it is stated that some of the compounds examined, namely those based on chlorinated naphthaquinones, have no harmful effect on germination. Soil and seed disinfection should be tested by mixing the fungicide with the seed in the sowing machine. —E.B.

Maintenance of fertility

342 IDNANI, M. A. **Use of sulphate of ammonia as fertilizer with special reference to Sind.** *Indian Fmg* 1949, **10**, 13-5. [Indian Agric. Res. Inst., New Delhi]

These trials with ammonium sulphate and other fertilizers show that one-third increases in crop yields were obtained with wheat, rice and cotton.—M.E.E.

343 OLIVA, A. Rese e scarti periodici del mais e della bietola nell'area dei terreni argillosi. [**Yield and periodic decline in production of maize and beet in the clayey soils area.**] *Humus, Milan* 1949, **5**, No. 11, 3-7.

Beet and maize are grown as summer dry weeded crops in North Italy and, under favourable ecological conditions, give the highest yields. Under unfavourable conditions, mainly determined by summer drought, production may decrease by 40 to 60 per cent. The soil of the region is hard, clayey and alkaline. Irrigation is highly important in reducing these losses provided the soil is permeable and properly managed.—E.B.

Weeds

344 HARDY, E. A. **Tillage and weed control.** *Agric. Inst. Rev.* 1949, **4**, 139-41. [Univ. Saskatchewan, Saskatoon]

345 BONJOUR, A. La aplicación de los productos químicos en la lucha contra las malezas. [**The application of chemicals to weed control.**] *Arch. fitotéc. Uruguay* 1949, **4**, 75-7, bibl. 10. [Inst. Fitotéc. La Estanzuela, Dept. Colonia, Urugay]

Paper presented to the Fourth South American Chemical Congress, Santiago, Chile, March 1948. *Raphanus sativus* is one of the most troublesome weeds of Uruguayan cultures. Control by means of sulphate of iron and similar products is too costly; control by hoeing has incurred (at La Estanzuela) an increase in the requisite number of days' work of from 181 in 1941 to 1413 in 1947, the average number of days' work per hectare for the last 4 years being 3.1, 2.7, 3.2 and 3.5 respectively. The use of phosphates encourages the growth of crucifers especially in linseed crops, but in lucerne cultures the result is to remove weeds such as *Wedelia glauca*. A commercial product based on 2-methyl-4-chlorophenoxyacetic acid proved entirely satisfactory for the control of *Raphanus sativus* either sprayed in solution or applied as a dust. The higher doses (50, 65 and 80 kg. per hectare) were especially effective. None of the crop plants treated suffered any injury, but some other weeds such as *Ammi majus* and *Anagallis arvensis* were destroyed. The cost of the treatment is materially less than that of hoeing where dirty fields are concerned, and the existence of special dusting apparatus for the control of locusts should facilitate its use.—G.M.R.

346 BONJOUR, A. Aspectos agronómicos de la lucha contra la vegetación adventicia. [**Agronomic aspects of weed control.**] *Arch. fitotéc. Uruguay* 1949, **4**, 122-5, bibl. 3. [Inst. Fitotéc. La Estanzuela, Dept. Colonia, Uruguay]

Paper presented to the Second South American Botanical Congress, Tucumán, Argentina, 1948. The most common invaders of cereal and oil plant cultures at La Estanzuela are *Raphanus sativus*, *Ammi majus*, *Anthemis cotula*, *Silene gallica* and *Anagallis arvensis*. The following cultural methods have been found successful in reducing their proportions. (1) Heavy and late sowings of winter cultures, especially oats, forage, barley and early wheats, a measure which discourages the development of *Raphanus sativus* in particular. (2) Summer cultures, hoed. (3) The grazing of fallows, which tend to develop a close cover of *Ammi majus*. This plant is readily grazed by cows and horses in the winter, when it is tender, and in summer by sheep, which relish the inflorescences to such an extent as to make the plant disappear. (4) Hand eradication of *Raphanus sativus* in non-hoed cultures and in the rows of hoed cultures. (5) Reaping cereals with the cutter of the mower placed as low as possible and threshing away from the field. (6) Avoiding the use for stock feed of roughage which may contain seed of *Raphanus sativus*. Reference has been made in another place (see Abs. 345) to the use of certain chemical controls which are less costly and more successful than agronomic measures for heavy weed growth, especially of *Raphanus sativus*.—G.M.R.

Machinery and Equipment

347 Boletín de Producción y Fomento Agrícola Nuevo tipo de silo subterráneo. [**New type of subterranean silo.**] *Bol. Prod. Fom. agríc.* 1949, **1**, No. 5, 23-6, illus. [Argentina]

A new silo for grain storage is described and illustrated by plans and photographs. It comprises several long, narrow units or cells each having a capacity of 900 to 1000 tons of grain. The cells are placed in lines 150 to 200 metres long, an arrangement which saves labour in construction and space in use.—G.M.R.

348 Farm Mechanization. **Drying grain in the sack.** *Farm Mech.* 1949, **3**, 196. [Nat. Inst. Agric. Engng]

A method of forcing warm air through apertures and gratings, over which are placed grain and seeds in sacks, is described. Results obtained at Silsoe have been encouraging. It is possible to dry from 19 to 14 per cent moisture content in about 5 hours, which means the handling of about 8 tons of grain in 20 working hours per day. This corresponds to a drier load of forty 1-cwt. M.A.F. hessian combine harvester sacks of grain. Sacks are filled so that when lying flat on the drying platform, they are between 6-9 in. high. Only cereal crops and peas have so far been considered. The arrangement of platform and air ducts can be altered to suit requirements. The following approximate operating figures are given: working temperature, average 250°F. above atmospheric; air volume, 5,700 cub. ft. per minute; drying rate, 1 per cent moisture content reduction per hour; fuel consumption (burner) 1 gal. per hour, Diesel oil; electric motor 3.5 H.P. —M.L.Y.

349 North, R. **Tractor trailers.** *Farm Mech.* 1949, **3**, 167-9.

A review of the results of some 15 years' experience in using tractors to cart sugar beet and other root crops off rather sticky land, in all kinds of weather. —M.L.Y.

350 Sprenger, J. J. I. Researchwerk voor de verbetering van graandrogers. [**Research work for the improvement of grain driers.**] *Landbouwk. Tijdschr.* 1950, **62**, 89-103. bibl. 13. [Cent. Inst. Agric. Res., Wageningen, Netherlands]

The increased use of combines for harvesting in the Netherlands has necessitated efforts to improve the existing grain driers. A preliminary report is given of research at Wageningen, which is concerned with the measurement of the drying properties and other constants of grain and seeds so that the effect of drying on baking quality and viability can be assessed. It is hoped subsequently to construct a model drier for experimental purposes, drying to be by means of a current of hot air as most Dutch plant is based on convection drying of this type. Findings are discussed under the heads moisture content, accuracy, methods of measurement (several forms of apparatus illustrated), behaviour of water in the grain, drying curves, measuring grain temperature, and the value of models.—G.M.R.

351 Sprenger, J. J. I. Het drogen van graan. [**Grain drying.**] *Versl. Cent. Inst. Landbouwk. Onderzoek* 1949, **1948**, 84-8, bibl. 3, illus. [Cent. Inst. Agric. Res., Wageningen, Netherlands]

The increasing use of combine harvesters in the Netherlands has shown the need for improved grain driers. At Wageningen, research with this aim is at present concerned with studies of factors affecting drying, such as the amount, temperature and moisture content of the air used for drying, initial moisture content and varietal characters of the grain, etc. Experiments have been made in drying grain at different temperatures in a semi-automatic electric oven of Danish manufacture and the following conclusions have been reached. With oven temperatures that are not excessive, after the warming-up period there is always a constant drying rate period followed (with a moisture content of approximately 24 per cent) by a falling drying rate period. In different varieties of grain, the rate of drying in these two periods seems to run exactly proportionally with the difference in vapour pressure between grain and hot air in the oven. As the moisture contents were found by weighing, that is to say, by an exact method, a new method has been discovered for determining the vapour pressure isotherm of grain. The course of the temperature during the warming-up period can be expressed in a formula. For different oven temperatures, the grain temperature always appears to vary proportionally with the difference between oven temperature and initial temperature. After the warming-up period, the grain temperature assumes a constant value which lies below the oven temperature to such an amount that the difference in heat corresponds to the moisture evaporation. From these findings the heat balance of the grain can be reckoned. Therein it is found that during the first 5 minutes' drying, more of the surplus heat of the air on the grain is invariably used for warming up than for evaporation. This leads to the assumption that the warming-up period, and therewith the whole drying period, can be shortened by beginning the process with a short period of high temperature.—G.M.R.

352 Alpe, A. Il motocoltivatore "Canguro" [**The power cultivator "Kangaroo"**] *Ann. Sper. agr.* 1949, **3. n.s.** 1161-6. [English summary, p. 1166] [Milan, Ist. sper. Meccan. agr.]

The machine described can be employed for superficial ploughing, harrowing, weeding, spraying, road hauling and as a stationary engine. The weight is 280 kg. and the consumption 12.6 to 14 grm. of petroleum per cubic metre of hoed earth. —E.B.

353 Food and Agriculture Organization. F.A.O. Agric. Stud. No. 6. **Storing and drying grain in Canada, in the United States and in the United Kingdom**. By *L. E. Kirk*, *Lee Ling* and *T. A. Oxley*. Washington. 1948. pp. 41.

The present practices of storage and conditioning in the above countries are described briefly, showing the main lines of development in areas where climate, crops, and the problems to be solved are in some respects radically different. Information is not promised on materials, construction, mechanics and cost of operating equipment. In Canada, 180°F. is the maximum temperature of hot air used in drying wheat, oats, barley, rye, maize and flax. Drying temperature for malting barley must not exceed 110°F. Moisture is reduced to 13.5, 13.8, 13.0, 13.8, 13.0, 14.5 and 9.5 per cent respectively. Drying at temperatures higher than the safety point has a detrimental effect on baking quality of wheat. Recommendations in the United States include moisture limits for maize, grain sorghum, soybeans, flaxseed, in addition to wheat, barley, oats and rye. Bin ventilation has been extensively studied in recent years. Natural circulation, forced draughts of unheated and heated air are compared. Stationary and portable equipment for drying grain in bins and maize in cribs are described. In Great Britain, the storage of imported and home-grown cereals presents two completely different problems. The traditional method of storage (stooking and stacking) are reviewed and compared with the advantages and disadvantages of the combine harvester. The importance of drying the grain is increasingly recognized and the hot-air drying techniques now being developed are discussed. Maximum temperatures recommended by the Ministry of Agriculture are as follows: wheat for milling 150°F.; barley and seed wheat 110-120°F.; linseed, mustard and other oily seeds 115°F.; oats and damp grain, except for seed, 180°F. Some features of drier design are outlined. Imported cereals, which contain less moisture, can be kept for several months in silos without special treatment.—M.L.Y.

354 Oklahoma Agricultural Experiment Station. Bull. No. B-328. **Farm sprayer for weed control.** By *W. J. Oates* and *R. H. Witt*. 1949. pp. 15.

A low-pressure sprayer, useful for both weed and insect control is described. Tables are given to facilitate the selection of the proper sized nozzle. —M.L.Y.

Diseases and Pests

355 Meulen, A. van der. De interprovinciale veldproeven en de Instituutsproeven met onkruidbestrijdingsmiddelen. [**The inter-provincial trials and the Institute's trials of weedkillers.**] *Versl. Cent. Inst. Landbouwk. Onderzoek* 1949, **1948**, 89-91. [Cent. Inst. Agric. Res., Wageningen, Netherlands]

Inter-provincial trials tested the time at which DNC should be applied to (a) winter rye on sandy soil, *Centaurea cyanus* and *Stellaria media* being the principal weeds; and (b) winter wheat on clay, *Stellaria media* and spring-germinating plants being the principal weeds. Half-monthly sprayings with 0.5 per cent DNC at the rate of 1000 litres per hectare from mid-November 1947 to mid-April 1948 produced in every case an increase in the yield of cereals of at least 200 kg. per hectare, but whereas in the rye optimal results were obtained from January spraying, the increase in yield being from 500 to 600 kg. per ha., in wheat the results were approximately unchanged (increase, 200 kg. per ha.) irrespective of the time of application. The possible reasons for this are discussed. Another trial compared DNC and calcium cyanamide applied in the winter or in March, with or without hoeing. Results (not yet complete) indicate that a higher yield from rye grown in sandy soil is obtainable from winter treatment, that DNC gives better results than calcium cyanamide, and that hoeing after treatment with a herbicide gives little result on sand but more on clay. A further experiment, conducted by the Central Institute, gave the following results:

	Yield of grain, kg. per are	
	Wheat on clay	Rye on sand
Hoed		
DNC	36.6	24.7
No treatment	35.0	23.0
Not hoed		
DNC	33.9	24.5
No treatment	33.1	20.7

Experiment Series No. 173 tested the effect of DNC and calcium cyanamide, with and without hoeing, as applied to oat cultures in sand, with the following results:

	Yield of grain, kg. per are	
	Hoed	Not hoed
DNC	32.5	32.0
Calcium cyanamide	31.5	31.5
No treatment	32.0	29.2

—G.M.R.

356 CIFERRI, R. Come agiscono gli anticrittogamici. [**Mechanism of action of the fungicides.**] *Humus, Milan* 1950, **6,** No. 3, 17-9.
The action of copper and sulphur compounds is examined.—E.B.

357 CHIAROMONTE, A. Precisazioni su *Contarinia sorghicola* Coq. nell'Africa Orientale Italiana. **[*Contarinia sorghicola* Coq. in Italian East Africa.]** *Riv. Agric. subtrop. e trop.* 1949, **43**, 195-8. [English summary, p. 198]
In Eritrea and Somaliland durra [sorghum] grown on dry land is the basic native food crop. On the Somaliland farms run by Italian settlers maize is preferred. It gives higher yields than durra, and two crops per year are obtained under irrigation, the water being derived from the Juba and the Webi Shebeli rivers. The pest in question is not recorded on durra.—E.B.

358 TREHAN, K. N., and HALLEPPANAWAR, N. L. **Life-history, bionomics and control of safflower aphids (*Macrosiphum jaceace* Lin.)** *Curr. Sci.* 1949, **18**, 211-2. [Entomological Lab., Coll. of Agric., Poona]
Among the pests which attack *Carthamus tinctorius* in Bombay Province are the leaf-eating caterpillars, *Perigea capensis*, and the aphids, *M. jaceace.* Infestation by aphids may amount to 80 per cent and the pest has been observed breeding on six different host plants. DDT sprays and dust were successfully employed, among other insecticides.—M.E.E.

CEREALS

MISCELLANEOUS

359 DOBBEN, W. H. van. Interprovinciale veldproeven met stikstofgiften en rijenafstanden bij wintergraan. [**Inter-provincial field trials of winter cereals under different doses of nitrogen and different planting distances.**] *Versl. Cent. Inst. Landbouwk. Onderzoek* 1949, **1948**, 49-53. [Cent. Inst. Agric. Res., Wageningen, Netherlands]
Results of a considerable number of trials are concerned chiefly with the reactions of the crops to different doses of nitrogenous fertilizer (see *Soils and Fertilizers*). In one experiment six different drill widths ranging from 10 cm. to 30 cm. (4 in. to 12 in.) were tested without any significant difference in results. In inter-provincial experiments four drill widths ranging from 18 cm. to 30 cm. were tested in winter rye cultures. The following figures indicate the stiffness of straw recorded in the last-named experiments :

N kg. per ha.	Drill widths in cm.			
	18	22	26	30
60	9	9	9	9
100	8.1	8	8.5	8.2
120	6.5	6.8	6.9	7.3
140	5.2	5.7	6	7.3

It is concluded that in rye the drill width may safely be enlarged to 30 cm. without prejudice to yield, thus ensuring less liability to lodging and less suppression of an undersown crop. In this connexion an undersowing of clover was to be tested in 1949.—G.M.R.

360 MANUNTA, Carmela. Pigmenti carotenoidi delle cariossidi in varie razze di orzo, segale e avena. [**Carotinoid pigments of the grains in various races of barley, rye and oats.**] *Genet. agr.* 1948, **1**, 360-5. [English summary, 365]
The grain of these cereals contains α-carotene and free and combined lutein. In oats nearly all the pigment is free lutein ; in rye the three constituents are present in about the same quantity, with a slight prevalence of carotene ; in barley there is a wide range of variations in the twenty-six varieties examined, but the proportion of free and combined lutein is about 1 : 1.—E.B.

361 PAVLOV, I. P. [**Field crops for Transbaikalia.**] *Selek. Semenovod.* 1949, No. 2, 49-54. [Russian]
The introduction of medium-late cereal strains and the exclusion of early strains is a result of conclusions drawn from too general a survey of the country. Some local agronomists maintain that early strains are superior, but this cannot be substantiated because the early strains outyield the medium-late only when grown in depressions. The author advocates that, in addition to medium-late strains for general use, the early strains should be considered in certain zones. Early Garnet wheat (sensitive to temperature) is thought to be less suitable as a basic variety than a red-grained local strain of *Triticum ferrugineum sibiricum.* The early Tulun 86/5 oat and A-74 barley are recommended for low-lying lands.—M.A.O.

362 Timofeeva-Tjulina, M. T. [**Physiological characteristics of winter hardiness in winter wheat and rye.**] *Selek. Semenovod.* 1949, No. 2, 27-31. [Russian] [Dokučaev Inst. Agric.]

The relative winter hardiness in five rye and twenty-three wheat varieties is shown to depend on exposure to low temperatures. In most cases the frost resistance of the plants was reduced after thawing. The absolute and relative winter hardiness, particularly in new varieties, depend on conditions of growth. All rye and wheat varieties tested at the Institute, in contrast to those tested at the Talovsk State Variety Test Sta., showed much greater winter hardiness in pot than in field tests. The seeding depth affects winter hardiness: seed sown 5-6 cm. deep followed by rolling was better than a deeper sowing without rolling. Not all plants which survived reached earing; among rye varieties, only Alpine eared fully, whereas the wheat varieties Hostianum 0237, Lutescens 108 and 30-1 and Odessa 12 failed to ear fully. The rapidity of differentiation in the growing points and the sensitiveness and response of plants to light and temperature after vernalization determine winter hardiness in the plants.—M.A.O.

363 Kuznecov, I. N. [**Improvmeent of seed production in the Omsk province**] *Selek. Semenovod.* 1949, No. 4, 17-9. [Russian]

A continual decline in the area under standard varieties of cereals in the Omsk region (in the case of spring wheat from 57 per cent in 1945 to 38 per cent n 1948) is a result of a too formal approach to varietal zoning. Caesium 111 is rarely used now as it is heavily infected by smut. Heat disinfection of seed is ineffective and far too difficult under farming conditions. Rejuvenation of seeds by sowing n autumn is rarely practised, although the method s highly effective. The method of heating seeds before sowing, designed to improve germination, is not successful with seeds of low vitality. This method mproves not only germination, but also grain yield, and should be more widely applied in seed production.—M.A.O.

364 Ivanova, Z. V. [**Removal of the naphthaline odour from seed of wheat and oats by means of heat.**] *Doklady Vsesojuz. Akad. S.-H. Nauk.* 1949. No. 8, 19-22. [Russian] [Plant Protection Sta., Moscow]

The odour of naphthaline can be removed from seed of wheat, rye and oats by heat treatment. In driers the grain is subjected to a temperature of 45 to 50°C. during 10 hours over 2 days. With natural sun-drying the intensity of the solar radiation should not be less than 0.9 to 1.0 calorie, the temperature of the surrounding atmosphere not below 27°, the temperature in the grain 31 to 36°, and the circulation of air 3.1 to 4.3 m. per sec. When subjected to such treatment for 6 hours daily, grain drying is completed in 2 days. Heat-treated grain can be used for human consumption and for fodder.—R.P.J.

365 Longchamp, R., and Gautheret, R. J. Recherches sur le désherbage des champs de céréals au moyen de régulateurs de croissance. [**Researches on the control of weeds in cereals by means of growth-regulating substances.**] *Ann. agron., Paris* 1949, **19**, 380-408, bibl 42. [Stat. Centrale de Pathologie végétale, Versailles (R.L.) and Univ. Paris (R.J.G.)]

The experiments are of a preliminary nature, and results are given of the effect of different growth-regulating substances on each of the cereals, wheat, oats, and barley, when the herbicide is applied at different concentrations and by different methods of application. On account of the danger to other crops when applied as powder or spray, the use of these substances in manure has been investigated. More specific studies will be made before recommendations can be given for the general use of these herbicides in manure.—D.B.

366 Goulden, C. H., Stevenson, T. M. *et al.* **Breeding for disease resistance in Canada. Pt. 1. Cereals.** *Emp. J. exp. Agric.* 1949, **17**, 133-40. [Cent. Exp. Fm., Ottawa, Ontario]

See *Plant Breeding Abstracts*

367 Harrington, J. B., and Waywell, C. G. **Testing resistance to shattering and lodging in cereals.** *Sci. Agric.* 1950, **30**, 51-60. [Univ. Saskatchewan, Saskatoon]

Fourteen methods and devices were used in an endeavour to develop better procedures for determining the relative resistance of varieties of cereal crops to shattering and lodging. Three of the methods showed promising results. These are: (a) determining glume pulling resistance to obtain an estimate of shattering resistance; (b) beating grain heads with a paddle to determine shattering resistance directly; and (c) counting the number of crown roots to obtain an indication of lodging resistance.—Authors' summary.

WHEAT

Agronomy

368 Taranec, M. P. [**Frost resistance of spring wheat at different phases of development in Komi ASSR**] *Doklady Akad. Nauk. SSSR* 1949, **67**, 929-32. [Russian]

There has been insufficient study of frost resistance in spring wheat, especially at the stage from germination to seed ripening, and of the factors which prevent germination of seed subjected to frost at the time of ripening. The author therefore studied frost resistance of the Garnet variety of spring wheat at all stages of growth under conditions at Syktyvkar during 1947-8. Data on phase of development, date and duration of frosts, and percentage of damage to whole plants, leaves, ears and seed are recorded in tabular form.—M.H.

369 Frazão, E. A. M. A chuvas de inverno e o rendimento cultural do trigo. [**Winter rainfall and wheat yield.**] *An. Inst. sup. Agron. Lisboa* 1943, **14**, 189-200. [Received 1949] [Chair of Agric. Physics, Inst. Sup. Agron., Lisbon]

Wheat growing in Portugal has practically nothing to fear from frost in spring, but rainfall in winter (Nov.-Jan.) and spring (Feb.-March) is of decisive importance for yield and it is possible to forecast the harvest from its amount and distribution at these seasons. The author tabulates the winter and spring rainfall for each of the 29 years, 1914 to 1943 as recorded at three meteorological stations situated in the north, centre and south of Alentejo, the province which grows over one-half of the wheat produced in Portugal. Against these data he places forecasts of the yield anticipated, whether good (exceeding the mean yield of the preceding 10 years by 10 per cent), bad (less than this mean by 10 per cent), or normal (between these two limits), together with the actual yields obtained both in Alentejo and in the rest of Portugal. All six forecasts of bad harvests were confirmed, as were thirteen of the seventeen forecasts of good harvests. The reasons for the few slight discrepancies between the forecasts and actual results are discussed. It was found that a rainfall of approximately 400 mm. in the November-January period is as a rule sufficient to determine a bad yield of wheat. The same is true of a November-January rainfall of over 300 mm. followed by a February-March rainfall of 200 mm. and over ; but if the Feb.-March rainfall is less than 200 mm. and February in particular is more or less dry, a normal to good harvest may be expected. Rainfall of less than 200 mm. in either winter or spring periods, combined with a more or less dry February, is generally correlated with a good harvest. In the years under observation, no instance is recorded of yield being reduced through lack of moisture in winter, and it is assumed that such a reduction would occur only if the total rainfall for the winter and spring periods were less than 150 mm. The above findings, although relating directly to the province of Alentejo, may be applied to the whole of Portugal without any great risk of error.—G.M.R.

370 Avanzi, E. Ricerche sull'epoca di semina del grano. [**Research on time of sowing wheat.**] *Ann. Fac. Agr. Univ. Pisa* 1942, **5**, 57. [French, German and English summaries, p. 1] [Received 1949]

371 Cutler, G. H., Dionisio Pavez, S., and Mulvey, R. R. **The effect of clipping to simulate pasturing winter wheat on the growth, yield and quality of the crop.** *Agron. J.* 1949, **41**, 169-73. [Purdue Univ., Agric. Exp. Sta.]

An account is given of two experiments using the winter wheat variety " Fairfield" in Indiana. Plots were clipped to a height of 3 in. on various dates in April. In 1945 the wheat was growing on fertile soil and weather conditions in March and April were favourable to growth. Clipping on and between April 1st and 20th significantly increased both yield and quality, whereas clipping after April 20th reduced the yield. In 1946, however, on less fertile soil and with conditions in April unfavourable to growth, all clipping treatments in April reduced the yield. Reduced lodging due to clipping is associated with : shorter plants, shortness of the lower internodes, increased thousand-grain weights. Clipping is therefore advised in early spring when conditions for growth are favourable.—R.N.H.W.

Varieties

372 Šalavin, A. I. [**Methods of breeding winter wheat in the non-black soil zone**] *Selek. Semenovod.* 1949, No. 10, 26-8. [Russian] [Inspector for Grain Crop Varietal Trials, Udmurt, ASSR]

The author quotes the work of Budkov, and compares results of tests made at the Sarapuljsk Experimental Field on yields of winter wheat (variety Lutescens 116). During the period 1942-48 plants were subjected to snow covers varying in thickness between 44 and 78 cm. and the minimum temperatures at the tillering nodes ranged from —2.3 to —13.1 Celsius. There is evidence that the plants perished from smothering and not from intense frost. This is discussed in regard to the type of resistance needed in wheats for the northern non-black soil zone.—M.H.

373 Vaterkrampf, F. P. [**Iskra variety of spring wheat.**] *Selek. Semenovod.* 1950, No. 1, 46-8. [Russian]

Trials with this new variety have been in progress at the Čeljabinsk State Plant Breeding Station since 1942, and the data show that with early sowing (the end of April and the first ten days of May) the yield is on the average 2.2 centners per ha. larger than with sowing from 10 to 20 May. Sowing in widely spaced drills (33 to 35 cm. apart) with half the usual seed rate gave a yield of 27 centners per ha. It is intended that Iskra shall replace the lower yielding variety Milturum 321 in the Kurgan and Čeljabinsk provinces.—R.P.J.

374 RYŽEĬ, I. P. [**Plant growth and grain formation in winter wheat.**] *Selek. Semenovod.* 1949, No. 2, 35-7. [Russian] [Kirgiz State Breed Sta.]

The rapidity of spring growth and grain formation is considered a reliable criterion for evaluating productivity and suitability of varieties for Kirghizia. A brief review of results obtained in varietal tests is given.—M.A.O.

375 FAJERSSON, F. Weibulls Original Pondusvårvete. [**Weibulls Original Pondus spring wheat.**] *Weibulls ill. Årsb.* 1950, **45,** 3-7.

This new spring wheat variety, which has now been placed on the market, is a combination between autumn and spring wheat. In yield it is superior to all the spring wheat varieties on the market. It has stiff straw, occupying a position between Brons and Kärn II in this respect: the straw is approximately 5 cm. shorter than in Kärn II. In earliness it is intermediate between the early variety Kärn II and the late variety Progress. In baking quality Pondus is comparable with Brons.—R.P.J.

376 BJAANES, M. Forsøk med høstkveite. [**Trials with varieties of winter wheat.**] *Meld. Statens Forsøksgard Møistad* 1946-47, 1949, pp. H58-76. [English summary]

Experiments with autumn wheat comprise nine fields at the Norwegian State Experimental Station at Møistad and eight local trials in the same district. Overwintering of all the hardy varieties was good each year. Sowing was carried out at the Experimental Station between 31 August and 13 September on 2nd-year ploughed up ley. The varieties tested were Sigyn and the related line 0136, Heid, Enger, Follo (055-2B30), the Svalöf varieties Gluten and Gyllen, and the Weibull variety Jarl. [Trans. available).—R.P.J.

377 BJAANES, M. Trym 02400, en ny vårkveitesort for Oplandenes lavlandsdistrikter. [**Trym 02400, a vew variety of spring wheat for the lowland districts in Hedmark and Opland (Norway)**] *Meld. Statens. Forsøksgard Møistad* 1946-47, 1949, pp. H77-93. [English summary]

In experiments with spring wheat carried out by Møistad State Experimental Station, the lines 02344 and 02400 (Huron × Fylgia) have attracted most attention in 1941-47 trials. On the experimental farm they gave respectively 7 per cent and 6 per cent higher yields than Diamant II. Fram II, which together with Diamant II is most widely cultivated in this district, is almost equal to Diamant II in yield. The difference in yield between Diamant II and these two lines is significant. Both lines are slightly later than Fram II, but two days earlier than Diamant II. Line 02400 is nearly as stiff in the straw as Diamant II. In the local trials, 02400 has given a slightly higher yield than 02344. The average for all the trials, both those of the experimental farm and the local trials, shows a 6 per cent larger crop for 02400 than for Diamant II, the corresponding figure for 02344 being only 4 per cent. The baking quality of these two lines is slightly inferior to that of Diamant II. 02400 gives the heavier crop and is less prone to lodging than 02344. It has now been distributed under the name of Trym. It can be recommended for low-lying districts in Hedmark and Opland. It is awnless, with large, light yellow grain.—R.P.J.

378 VALDEYRON, G., SÉGUÉLA, J., and LEGAY, J. Note sur quelques propriétés biométriques du blé et leur intérêt en matière de sélection variétale. [**Observation on certain biometrical properties of wheat and their bearing on selection of variety.**] *C. R. Acad. Agric. Fr.* 1949, **35,** 354-6.

A study of the correlation between variation in weight of ears and weight of grain, dealing with a large selection of varieties and crosses emanating from scattered districts in Tunisia. A total of 4,000 ears was recorded during the 1947-48 season, the samples representing widely different conditions. Average productivity has been estimated and conclusions drawn.—M.L.Y.

379 LEITE-RIO, L. F. Estudos sobre a colecção de trigos da Estação de Melhoramento de Plantas. Dez anos de observações. [**Studies of the wheat collection at the Plant Breeding Station, Elvas. Ten years' observations.**] *Melhoramento* 1948, **1,** 7-41. [English summary, 39-40.] bibl. 10, 21 pls. [Head of Lab. Cytology and Genetics, Plant Breeding Station, Elvas, Portugal]

This 10-year study refers to 1300 forms of different spp. of *Triticum* emanating from several countries. The following aspects are especially considered. (1) Total length of the vegetative cycle and length of the periods emergence to earing and earing to wax maturity of the grain. The variation of these periods throughout the 10 years and their correlations with rainfall and temperature are shown. The author infers that the duration of the total cycle and that of the emergence to earing period is longer in wheats from countries above the latitude 45°N., and establishes a relationship between this fact and the daylength. (2) Data on the earliness of the collected forms are presented and a case of transgressive variation is noted. (3) Data on resistance to soil aridity, to the dry, warm south-east wind and to lodging show the northern wheats, with their longer growing period, to be more resistant than others to these adverse conditions, while numerous forms of *T. durum* are resistant to the south-east wind. A physiological reason for this is suggested by the author, while it is possible, also, that the more powerful root system of the wheats with the longer growing period gives them greater resistance.—From author's summary.—G.M.R.

380 SOUTH DAKOTA Agricultural Experiment Station. Bull. 394. **Rushmore spring wheat.** 1949. pp. 7.

About 4,800 bushels of Rushmore (Rival × Thatcher 2280, C.i. 12273) were released to the Crop Improvement Associations by the South Dakota Agricultural Experiment Station in the spring of 1949. Because this variety is early, stiff-strawed and resistant to shattering, it is expected to be important for agriculture of South Dakota. Yielding ability is satisfactory under South Dakota conditions.—From summary.

381 FISCHER, G. J., SPANGENBERG, J., RIERA, O., GHEORGHIANOV, V., LAZARO, R., and BELMONTE, J. La sección uruguaya de los ensayos internacionales de trigo del año 1942. [**The Uruguayan section of the international wheat trials made in 1942.**] *Arch. fitotéc. Uruguay* 1949, **4**, 23-35, bibl 4. [Inst. Fitotéc. La Estanzuela (G.J.F.); Prof. Genet. Fac. Agron. Univ. Montevideo (J.S.); Director, Agric. Exp. Sta. Salto (O.R.); Dept. Genet. Fac. Agron. Univ. Montevideo (R.L.)]

Paper presented to the Second Argentine Congress on Agronomy, Cordoba, 1943. The 1942 wheat trials were conducted with uniform material and methods in Brazil, Argentina, Chile and Uruguay. An account is given of the Uruguayan part of the work, which took place in four widely separated places. Nine wheat varieties, namely, Fontana, Rio Negro, 1051 (from the Santa Catalina Plant Breeding Station), Litoral 1, Litoral 2, Litoral Precoz, Sinvalocho, Sinbar, and Klein 157, were tested under twenty-seven combinations of time of sowing (early, normal or late), seeding rate or density, and manurial treatment. Results obtained are described in considerable detail and concern, among other things, yield of grain and straw, grain weight in mgrm., time of fermentation in minutes, and the influence of variety, density and locality.—G.M.R.

382 GIBERTI, C. Grado de difusión alcanzado por las variedades de trigo en la región triguera Argentina durante el decenio 1936/37 a 1945/46. [**Distribution of wheat varieties in the Argentine wheat-growing region during the 10 years 1936-37 to 1945-46.**] *Granos* 1948, **12**, No. 4-6, 10-7. [Nat. Comm. Grain, Argentina]

There has been a steady increase in the percentage of hard wheats grown and, as the total wheat area has not increased, a consequent drop in the percentage of semi-hard and soft wheats. The proportion of soft wheats has diminished rapidly within the last 5 years and they have now practically disappeared. The principal hard wheat varieties are Lin Calel M.A., Sinvalocho M.A. and Klein 157, and of the semi-hard wheats 38 M.A. and Klein Cometa are the most important.—G.M.R.

383 ARGENTINA, Ministerio de Agricultura, División de Exploraciones e Introducción de Plantas. Circ. No. 12. Inventario de material fitotécnico. No. 2. Trigos (*Triticum* spp.). By *J. E. Porta.* [**Inventory of plant material. No. 2. Wheats.**] 1949. pp. 49. [Mimeographed]

An alphabetical list of many wheat varieties under trial by the Argentine Division of Plant Introduction and Experiment Stations. The list is based on the records for 1947.—G.M.R.

384 ARGENTINE REPUBLIC, Ministerio de Agricultura Variedades de trigo aconsejadas por el Tribunal de Fiscalización de Semillas para la siembra del año 1948. [**Wheat varieties recommended by the Seed Control Tribunal for 1948 sowing.**] *Granos* 1948, **12**, No. 4-6, 30-9.

Transcript of the Ministry's *Publ. Misc.* No. 248, 1948. The wheat-growing region of Argentina is mapped and divided into six sub-regions, for each of which certain wheats, all hard or semi-hard, are recommended. Information is given on the best sowing dates in the various regions. The names of the Tribunal members are appended.—G.M.R.

Seeds

385 LENGLEN, M. Le blé d'Egypte. [**Egyptian wheat**] *C. R. Acad. Agric. Fr.* 1949, **35**, 335-41.

Much speculation has been attached to the germination capacity and productive value of the so-called Egyptian or 'Miracle' wheat, dating back to the days of the Pharaohs. Research has continued throughout the centuries and in this paper references are given covering the past 200 years.—M.L.Y.

386 TALLARICO, G. I semi germinati di grano. [**Germinated wheat seeds.**] *G. Agric. Domen.* 1950, **60**, 37.

The author briefly illustrates the fact that germinated wheat seeds (as well as seeds of other cereals and legumes) have a higher vitamin content than dry seeds, and indicates the possibilities presented by this source of vitamins.—E.B.

387 BORZINI, G. La carie e le trebbie. Grani illesi e "criptolesionati." [**Bunt and threshing machines. Uninjured wheat grains and grains with hidden injuries.**] *G. Agric. Domen.* 1949, **59**, 335.

The author discusses the possibility of treating rains for bunt control and at the same time of voiding the causes which are responsibile for low ermination.—E.B.

88 HLYNKA, I., MARTENS, V., and ANDERSON, J. A. **A conservative study of ten electrical meters for determining moisture content of wheat.** *Canad. J. Res.* 1949, **27**, Sect. F. 382-97, bibl. 6.

en electrical moisture meters were tested with 159 mples of Canadian hard red spring wheat, of rades 1, 2, 3 and 4 Northern, representing a oisture range of 11 to 17 per cent. The two-stage acuum oven and Brown-Duvel methods were used s bases of comparison. Regression equations, andard errors of estimate, and data on temperare effects are reported. The standard error of stimate of vacuum oven results was 0.15 per cent r the Brown-Duvel method, 0.23 per cent for e Tag-Heppenstall meter, and 0.28 per cent for e Universal meter. Other meters had higher rors of estimate.—Authors' abstract.

39 PAULL, A. E., and MARTENS, V. **Factors affecting the determination of moisture in hard red spring wheat by commercial electrical meters.** *Canad. J. Res.* 1949, **27**, Sect. F. 479-82. [Grain Res. Lab., Board of Grain Commissioners for Canada, Winnipeg, Man.]

tatistical analysis of data obtained with eight mmercial electrical moisture meters and 159 mples of hard red spring wheat shows that ariations in bushel weight and kernel weight have n effect on the moisture readings but variations in rotein and ash content do not. An appreciable mount (from 10 to 30 per cent) of the variation in e G.R.L., Steinlite, Marconi, and Mullard readgs is attributable to variations in bushel weight one ; and in the Patterson and Tag-Dielectric adings to bushel weight and kernel weight jointly. he Tag-Heppenstall and Universal meters are not fluenced appreciably by the factors investigated. -Authors' abstract.

0 CORTABARRIA, E. J., BARDIER, M., and FISCHER, G. J. La diferente susceptibilidad de muestras de trigo a los tratamientos anticriptogámicos. [**The different susceptibility of wheat samples to fungicides.**] *Arch. fitotéc. Uruguay* 1949, **4**, 55-60, bibl. 12. [Agric. Exp. Sta. La Estanzuela (E.J.C. and G.J.F.), and Laboratories Section, Directorate of Agronomy, Montevideo (M.B.)]

n account is given of (a) Uruguayan efforts to perct the germination test from 1937 onwards, and) a test in which nine varieties of wheat were set germinate in sand and earth respectively and nder three different treatments, namely, copper lphate, copper carbonate, and a proprietary compound based on an ethyl-phosphate of mercury. The results are presented in tables and by means of graphs. Copper carbonate is one of the treatments which can be safely employed on a large scale. Great individuality is evident in the different wheat varieties in their reaction to the various treatments. The importance of determining the lethal doses of antiseptic treatments is stressed.—G.M.R.

391 FISCHER, G. J., UBISCH, Gerta v., and SILVA, A. R. da Germinación de semillas tratadas con disinfectantes y estimulantes. [**Germination of seeds treated with disinfectants and stimulants.**] *Arch. fitotéc. Uruguay* 1949, **4**, 20-2., bibl. 6. [Inst. Fitotéc. La Estanzuela, Uruguay]

Paper presented to the Second Argentine Conference of Agronomists, Córdoba, April 1943. Wheat grains debilitated from hot water treatment of varying duration and temperature were subsequently immersed in solutions of growth-promoting substances extracted from the root nodules of legumes, from cassava, maize pollen and potatoes respectively. Germination as affected by the different treatments is tabulated, and results are treated statistically by means of Bliss and Fisher's angular transformation method. The analysis of variance stresses the effect of the temperature and duration of the hot water treatment and their interaction. Treatment under a temperature of 49°C. for a prolonged period can be fatal. The effect of the plant stimulants was insignificant.—G.M.R.

392 CAFFERA, R. Los consejos oficiales para la siembra del trigo. Elección de variedades para 1948. [**Official recommendations for the sowing of wheat. Choice of varieties for 1948.**] *Granos* 1948, **12,** No. 4-6, 22-5. [Directorate Prod. Grain and Forage, Min. Agric. Argentina]

An exposition of the principles and research upon which the recommendations of the Argentine Seed Control Tribunal are based.—G.M.R.

Diseases and Pests

393 VASUDEVA, R. S., and DUTT, K. M. **Some observations on the performance of seed from rust-affected wheat plants.** *Indian Fmg* 1949, **10**, 16-8. [Indian Agric. Res. Inst., New Delhi]

Germination tests were undertaken to determine whether the crop raised from rust-infected wheat seeds would be profitable. Healthy and rust-affected plants of three varieties were grown on adjacent plots from October 1947. The absolute weight of seed of all the varieties planted is much lower in the case of rust-affected plant grains, but no appreciable differences were observed in weight and density of grains raised from healthy and rust-affected plant seed. These results show the possibilities of employing shrivelled grains in times of shortage.—M.E.E.

394 BORZINI, G. Risultati di esperienze di lotta contro la " carie " del frumento (*Tilletia* spp) eseguite a Certosa (Pavia) nel 1947-48. [**Results of control trials of wheat bunt** (*Tilletia* **spp.**) **carried out at Certosa (Pavia) in 1947-48**] *Ann. Sper. agr.* 1949, **3**, 1271-6. [English summary, 1276] [Pavia, Lab. crittogam. ital.]

Artificially infected wheat seeds were treated with various copper, mercury, zinc and non-metallic compounds before sowing. Control of bunt was obtained with copper oxychlorides and oxides, mercuric organic compounds and chlorinated naphtha- and benzoquinones. 1,4 dichlorophenylmercury acetate, mixtures of mercury compounds of p-dichlorobenzene, mercury oxime, mercury 2, 4-di-iodophenol sulphonate, were less active. Other compounds proved ineffective under experimental conditions.—E.B.

OATS

Agronomy

395 STRZEMSKA, J. Zagadnienie mikoryzy u zbóz cz. . I. Owies. [**The mycorrhiza of corn plants. Part 1, Oats.**] *Ann. Univ. M. Curie Sklodowska* 1949, **4**, 359-72. [English summary, 370.]

This is a first report concerned with the formation of mycorrhiza in grain plants. The influence of soil type and pH have been specially studied. The results of observations on mycorrhiza formation in different root parts and at different stages of growth are given (first stage of development, formation of ears or flowering, and ripeness.)—From author's summary.

396 PAAUW, F. van der. Weerstand en schade van haver bij droogte. [**Weather and injury to oats from drought.**] T. N. O. Nieuws No. 4. **n.d.** pp. 4. [Agric. Exp. Sta. and T.N.O., Inst. Soil Research Groningen, Netherlands]

A full account of the experiment here described is given in *Plant and Soil*, 1. 303-41. 1949.—G.M.R.

Varieties

397 JONES, E. T. **The breeding of disease-resistant varieties of oats. Part 1. Physiologic races, diseases, and pests.** *Emp. J. exp. Agric.* 1949, **17**, 199-204. [Welsh Plant Breed. Sta., Aberystwyth]

Four physiologic races of stem rust (*Puccinia graminus* var. *avenae*) and crown rust (*Puccinia coronata* var. *avenae*) and thirty-one races of loose and covered smut (*Ustilago* spp.) have been seen on oat varieties. Though no recorded work has been done on physiologic races of mildew (*Erysiphe graminis avenae*), experiments at the above Station indicate that oat varieties are resistant at certain growth phases. Leaf spot and seedling blight can be controlled by treating seed with organo-mercurial dressings. *Helminosporium victoriae*, occurring on the variety Victoria and all crown-rust resistant derivatives of Victoria parentage in America, is only partially controlled by such treatment. Experiments at Aberystwyth prove that the diploid oat variety Ceirch Llwyd Cwta (S171) is less susceptible to attack by *Ophiobolus graminis avenae* than are common oat varieties. The varieties Summer, Spet, Hede and Eagle are moderately resistant to frit fly attack and Grew winter, S81, Picton, Avoine d'hiver, Unique, Victoria, Capa and Pampa are resistant to stem eelworm.—K.O.

398 ARGENTINA, Ministerio de Agricultura, División de Exploraciones e Introducción de Plantas. Circ. No. 11. Inventario de material fitotécnico. No. 1. Avenas (*Avena* spp.) By *J. E. Porta.* [**Inventory of plant material. No. 1. Oats.**] 1949, pp. 17. [Mimeographed]

A list of 330 oat varieties under trial by the Argentine Division of Plant Introduction and Experiment Station is presented in alphabetical order. The list is based on the records for 1947.—G.M.R.

399 RIBEIRO, R. Inclusión de la *Avena strigosa* entre las avenas de gran cultivo en el Uruguay. [**Inclusion of** *Avena strigosa* **among the large-scale oat cultures of Uruguay.**] *Arch fitotèc. Uruguay* 1949, **4**, 126-31, bibl. 19. [Inst. Fitotéc. La Estanzuela, Uruguay]

Paper presented to the Second South American Botanical Congress, Tucuman, Argentina, 1948. After a short bibliographical review of the oat varieties cultivated in the Rio Plata region and a botanical classification of those grown in Uruguay, a morphological description is given of a new variety which has been under study at La Estanzuela since 1945. This oat is identified as *Avena strigosa* Schreb. ssp. *strigosa* (Schreb.) Thell. var. *glabrescens* (Marquand) Thell., and the name under which it is distributed in Uruguay is Strigosa 3381. Approximately 50 to 70 tons were ready for distribution in 1948-49. Under natural conditions in 1945-47 the variety proved immune to attack by *Puccinia coronata avenae,* to which the other oats grown in Uruguay, namely, *Avena sativa*, *A. byzantina* and a hybrid of these two, are susceptible. Reports on trials of the new variety for grazing, as a soilage crop, and a producer of grain and straw in comparison with the other oats mentioned, show its yield to be more reliable because of its immunity to *P. coronata*, although somewhat lower than that of the others when there is no attack by this fungus. It is resistant to trampling and grazing and recovers quickly. Its low thousand-grain weight effects a saving of about one-third in the seeding rate, and the low percentage of glumes and the readiness with which these can be detached make it valuable for milling. Interspecific hybridization is in progress and, although no promising results are yet available, it is believed that greater productivity may be achieved thereby.—G.M.R.

BARLEY

Agronomy

400 BERG, C. van der. De verbouw van gerst op gronden, die met zout water overstroomd zijn geweest. [**Growing barley in land which has been inundated with salt water.**] *Jaarb. nat. Com. Brouwgerst* 1949, **13**, 36-47. [English summary] illus. [Scientific Division, Agric. Restoration Service, Netherlands]

On the basis of previous experience, beet and barley were the crops used as pioneers in the 75,000 hectares of Netherlands arable land flooded during the war by salt or brackish water, and barley once more demonstrated its ability to tolerate a fairly high percentage of salt and a poor soil structure. The 1946 and 1947 experimental results in the growing of Kenia spring-sown barley, with oats and peas as control crops, are discussed. Graphs show the relation of grain and straw yield to salt number or number of grm. NaCl per litre salt water. The ears of barley were well filled and protein content both in 1946 and 1947 was 50 per cent above the normal, a fact which is attributed to the absorption of a large amount of Na.—G.M.R.

Varieties

401 BJAANES, M. Forsøk med toradet bygg. [**Trials with varieties of two-rowed barley.**] *Meld. Statens Forsøksgard Møistad* 1946-47. 1949. pp. H94-130. [English summary]

The varieties Opal B, Maja and Kenia have been compared in forty-seven trials during a 12-year period, from 1935 to 1946. During the period 1940 to 1946 the weather was favourable for two-rowed barley, being on the whole much warmer than usual. Opal B ripens earliest, Kenia a couple of days later, and Maja one day later still. Maja and Kenia have rather stiffer straw than Opal B. Maja has given the highest yield, Kenia the lowest. During the whole period 1935 to 1946 Maja gave 14 kg. more grain per dekar than Opal B, and 28 kg. more than Kenia. Of the varieties of two-rowed barley at present on the market, Maja is decidedly the best. The Svalöf variety Freja has been included in some of the trials. The results so far indicate that it is not so high yielding as Maja, but is slightly earlier than that variety. Line 01435, a cross between Maskin and Opal B, is promising. It is rather late, about as late as Maja, and thus later than the parent varieties. It does not give so large a crop as Opal B (6 kg. per dekar less) but it is characterised by very strong straw. Comprehensive trials with this line are now in progress at Møistad and on other experimental farms.—R.P.J.

402 LJUBIMOVA, V. F. [**Local barleys of Kirgiz**] *Selek. Semenovod.* 1949, No. 10, 19-23. [Russian]

In the varietal populations of barley there are many ecological forms with wide distribution, extending to 3000-3300 metres above sea level. Of the nineteen different species found in Kirgiz, nine belong to the multiple-rowed barleys and ten to the two-rowed type. In addition there also occur two new species (described), namely, *Hordeum distichum* L. var. *kirgizstanicum* Lub., and *H. distichum* L. var. *nigrifurcatum* Lub.—M.H.

403 VELDHUIZEN, H. van. De Brouwgerstten-toonstelling 1947 en de kwaliteit van de nederlandse brouwgerst oogst 1947. [**The Malting Barley Exhibition and the quality of the Netherlands malting barley harvested in 1947.**] *Jaarb. nat. Com. Brouwgerst* 1949, **13**, 11-35.

The quality of the 1947 crop was the best within the 13 years' experience of the National Committee and only samples fully up to standard were exhibited. They numbered 206, and except for one sample of Saxonia were composed entirely of the variety Kenia. Combine harvesters were used on a large scale for the first time in 1947, and the quality of the grain thus harvested in comparison with that of grain harvested by self-binders is under investigation. Information on the chemical composition, etc. of the 1947 harvest is tabulated. Mean moisture content (15.3 per cent) was low for the Netherlands, mean protein content (10.9 per cent) relatively high, and germination capacity was satisfactory.—G.M.R.

404 WILTEN, W. De veldproeven in 1948. [**The field trials in 1948**] *Jaarb. nat. Com. Brouwgerst* 1949, **13**, 89-96. [English summary] [Loopschansstraat 28, Breda, Netherlands]

Report on trials conducted by the Netherlands National Committee for Malting Barley. (1) Trial of seven varieties under the application of three different quantities of nitrogenous fertilizer, in which Abed Kenia, the standard variety, gave relatively poor yields. (2) Trial in three localities of the four most promising varieties from the previous year's experiments, in which Balder gave everywhere a high yield. (3) Comparison of harvesting in shocks, shocks covered with sheaves, stacks or on tripods, in four plots. The poorest quality grain in every case came from the shocks, the best quality was obtained from stacks and tripods.—G.M.R.

405 Wilten, W. Opbrengsten, rassenstatistiek en raseigenschappen van brouwgerst. [**Yields, varietal statistics and varietal characters of malting barley.**] *Jaarb. nat. Com. Brouwgerst* 1949, **13**, 97-105. [English summary] [Loopschansstraat 28, Breda, Netherlands]

Information is presented by means of tables, a map and a chart, comparison being made with the Netherlands' returns from 1932 onwards. Weather conditions in 1948 seem to have been unfavourable for the standard variety Kenia, which gave low yields, although not for all other varieties. Balder appears to be slowly gaining in popularity.—G.M.R.

406 Haan, H. de Gerstveredeling in de Verenigde Staten. [**Barley breeding in the United States**] *Jaarb. nat. Com. Brouwgerst* 1949, **13**, 57-67. [English summary] bibl. 9.

The growing of malting barley in the States is based entirely on six-rowed varieties. Since the repeal of prohibition attention has been paid to malting quality in barley breeding, in which a crusade has been launched against rough awns. Awnless varieties or such as have little developed awns, forked types, and especially types with smooth awns are very popular.—From author's summary.—G.M.R.

407 Wilten, W. Verslag van een studiereis naar Denemarken en Zweden in 1948. [**Report on a tour in Denmark and Sweden, 1948**] *Jaarb. nat. Com. Brouwgerst* 1949, **13**, 78-88, illus. [Loopschansstraat 28, Breda, Netherlands]

An account of visits to Plant Breeding Stations in the countries mentioned, with special reference to Danish and Swedish barley varieties. A description is given also of a hot water seed disinfection plant observed in Denmark.—G.M.R.

408 Suneson, C. A. **Survival of four barley varieties in a mixture.** *Agron. J.* 1949, **41**, 459-61. [Divn. Cereal Crops and Diseases, Bur. Pl. Ind., U.S. Dept. Agric.]

Average yield figures of four barley varieties, Vaughn, Hero, Atlas and Club Mariout are given, together with a description of the effect of scald and mildew on the individual varieties.—S.D.

409 Albizzati, C. M. J., and Servici, Ana María El fraccionamiento del complejo proteico en las cebadas cerveceras cultivadas en la República Argentina. [**The fractionation of the protein complex in the malting barleys grown in the Argentine Republic.**] *Granos* 1948, **12**, Nos. 4-6, 3-9, bibl 6. [Min. Agric., Argentina]

Samples of two varieties of malting barley from the 1946-47 harvest of nine official experiment stations, located in different parts of the Argentine cereal zones, were analysed. Tabulated information on the eighteen local products is presented and is concerned with the total content of nitrogen and of its different components, and the average percentage of each fraction in the protein complex of the two varieties. The difference between the varieties is not great, as is shown by the following figures, and both are considered suitable malting material.

Percentage in the dry matter	La Prevision 19	Maltería Heda
Total nitrogen	2.244	2.150
Total protein of the ground grain . .	13.75	13.60
Percentage in 100 grm. of the protein complex :		
Leucosin	7.99	8.26
Edestin	4.48	4.37
Hordein	26.57	25.85
Glutelin	60.93	61.47

—G.M.R.

Weeds

410 Kole, A. P., and Zonderwijk, P. Onkruidbestrijding met chemische middelen in zomergerst. [**Chemical control of weeds in summer barley.**] *Jaarb. nat. Com. Brouwgerst*, 1949, **13**, 48-52.

Calcium cyanamide is excellent for controlling weeds in summer grain. The best results come from dusting it in the morning over a wet crop, when clear weather is expected, 5 or 6 weeks after sowing, the plants then being 7 to 10 cm. high. The crop is seriously damaged if calcium cyanamide is used too late. DNC is effective in the control of crucifers. It should be sprayed on when the weeds are still young and the barley a hand's breadth high, at the rate of 800 to 1000 litres per hectare, the concentration varying according to the preparation used. Late application is less effective and may injure the crop. The so-called root weeds such as thistles, docks and *Equisetum* are practically untouched by these means of control, but the commercial compounds based on the sodium salt of 4-chloro, 2-methyl phenoxyacetic acid are effective if applied later in the spring, but before ear emergence begins.—G.M.R.

RYE

Agronomy

411 DOBBEN, W. H. van. Enkele waarnemingen over de rijping van rogge. [**Some observations on the ripening of rye.**] *Versl. Cent. Inst. Landbouwk. Onderzoek* 1949, **1948**, 54-8. [Cent. Inst. Agric. Res., Wageningen, Netherlands]

n 1947 and 1948 samples of rye, each of 100 ears, vere taken at regular intervals from the beginning f July onwards until the plants were dead ripe nd were studied for (a) moisture content and (b) rain weight, the course of which in early, late and ery late varieties is shown in two graphs. Findings re discussed, and include the observation that the oticeably sharp drop which at some one point haracterizes the general decline in moisture con-ent during ripening may indicate that the seed nters upon a new phase of development, in which ranslocation of moisture from the plant becomes essened but that of reserve substances continues since increase in weight continues). Observations re not yet sufficient to indicate when this phase erminates. The observation is of practical im-ortance because rye is frequently mown with a noisture content of ± 30 per cent, which means nat in some years a crop is harvested before grain uality is fully developed.—G.M.R.

MAIZE

Agronomy

12 POELS, P. De teelt van korrelmaís in Limburg. [**The growing of grain maize in Limburg.**] *Maandbl. LandbVoorl Dnst.* 1949, **6**, 431-41. [Chief Asst., Limburg Agric. Advisory Serv., Roermond, Netherlands]

rom a small 5-are plot in 1934 maize growing in ne southern Netherlands Province of Limberg has ncreased, principally during the war, to 1977 ectares in 1948. It is used mainly for feeding oultry. Calculating 25 ares as necessary for feed-ng 100 head of poultry, and comparing the actual gures for poultry and for maize cultures on farms f different sizes, it is concluded that there is still oom for extension, especially on the 5 to 10-hectare rms. The advantages of maize growing are numerated and advice is given on soils (sandy clays ne best), cultural methods, varieties etc. Inter-ropping with a legume or grasses (but not annual rasses) is recommended. The herbage can also be ndersown. Topping the maize plants about 4 in. bove the cobs just before the latter are ripe urnishes a soilage crop very palatable to cows.—M.R.

413 NIELSON, H. M., and HANSEN, O. Forsøg med hybridmajs. [**Trials (in Denmark) with hybrid maize.**] *Ugeskr. Landm.* 1950, **95.** 99-103.

The trials were conducted at the Experiment Station of the Agricultural College of Denmark, mainly with early hybrid forms from Canada and the northern U.S.A. The results indicate that hybrid maize used for ensiling in Denmark is equivalent to mangels in yield: as maize cultivation can be mechanized more easily than that of root crops, maize should occupy part of the area devoted to the latter. In Denmark maize to be harvested ripe is too uncertain a crop to be cultivated on a large scale.—R.P.J.

414 UTTAMAN, P. **The effect of cocoanut water on the growth of immature embryos of corn (maize).** *Curr. Sci.* 1949, **18**, 251-2. [Agric. Res. Inst., Coimbatore]

The water has a decisive, depressing effect on the growth of immature embryos of corn, the effect on the root being more pronounced than on the shoot.—M.C.H.

415 SCOSSIROLI, R. Controllo di produzione di ibridi e varietà nostrane di mais a diverso investimento. [**Production of hybrid and local maize varieties with different spacings**] *Ann. Sper. agr.* 1949, **3**, 799-802. [English summary, 802] [Bergamo, Sta. Sper. Maiscolt.]

A series of plots of 200 sq. m. each were sown with hybrid and local free-pollinated varieties. In the case of the hybrids the spacing was 3 plants per sq. m. (which is known to be below the optimum); and in the case of the two local varieties 4.68 plants per sq. m. (which rate, in the particular conditions of the experiment, is about the optimum). In spite of the wider spacing, the hybrid varieties yielded more heavily, the increase being 25.4 to 18.1 per cent above the better of the two control varieties.—E.B.

416 KURTZ, T., MELSTED, S. W., and BRAY, R. H. **Yield and nitrogen composition of two single-cross corn hybrids when grown in alternate rows.** *Agron. J.* 1949, **41**, 474-6. [Dept. Agron., Illinois Agric. Res. Sta., Urbana, Ill.]

Two single-cross hybrids, WF$_9$ × Hy and K$_4$ × L$_{317}$, were grown in alternate rows in small plots with different treatments of fertilizer and water at Urbana in 1947. The yields of grain and stover and their nitrogen composition were determined for each hybrid within each plot.—From authors' summary.

417 Green, J. M. **Effect of flaming on the growth of inbred lines of corn.** *Agron. J.* 1949, **41**, 144-6. [Agric. Res. Admin., U.S. Dept. Agric.]

Delay in the date of flowering is often important in the production of hybrid corn. Five flaming treatments using three inbred lines of corn were compared with a control in two replications. Treatments consisted of flaming when the plants were 2, 4, 6 and 8 inches high ; also flaming at 2 inches and again when recovered plants reached 2 inches once more. The latter method was most effective and both silking and anthesis were delayed about 2.4 days. Yield reductions were small but significant; this suggested the advisability of delaying the anthesis of the male rather than the silking of the female. No significant alteration in grain moisture, plants erect at harvest, or ears per hundred plants, was observed.—R.N.H.W.

418 Rick, C. M., and Anderson, E. **On some uses of maize in the Sierra of Ancash.** *Ann. Mo. Bot. Gard.*, 1949, **36**, 405-12. [Coll. Agric., Univ. Calif., Davis.]

Varieties

419 Becker, W. R. Het maisrassenonderzoek. [**Maize variety trial.**] *Versl. Cent. Inst. Landbouwk. Onderzoek.* 1949, **1948**, 60-2. [Cent. Inst. Agric. Res., Wageningen, Netherlands]

The behaviour in 1948 of twenty-five maize varieties, including several American hybrids, is tabulated and discussed, with special reference to their suitability for different parts of the Netherlands.—G.M.R.

420 Bergamo, Stazione Sperimentale di Maiscoltura. Publ. No. 48. Rapporto sulla sperimentazione maidicola, 1948. [**Report on experiments with maize in 1948.**] By *L. Fenaroli.* 1949, pp. 46.

During this second year of experiments with hybrid maize the area under the control of the Station was extended from north to central and south Italy. Climatic conditions during the year were mainly unfavourable. Most of the trials took place in north Italy. The author concludes that the results from hybrid maize were favourable in twenty-five provinces (in twenty the average yield increase was above 20 per cent) ; that they were uncertain in twelve provinces (average increase between +10 and −10 per cent) ; and that in no province were they negative. For two provinces it was impossible to arrive at conclusions. In North Italy at least, the higher productivity of hybrid maize compared with the free-pollinated varieties is again confirmed.—E.B.

421 Bergamo, Stazione Sperimentale di Maiscoltura. Publ. No. 50. Maiscoltura. [**Maize cultivation**] By *L. Fenaroli.* 1949, pp. 7. Fenaroli, L. I mais ibridi in Italia. [**Hybrid maize in Italy**] *Ital. agric.* 1949, **86**, 689-94.

Italy has 1.2 to 1.5 million hectares under maize with a total production of 25 to 30 million quintals: in Europe she is inferior only to Romania, Russia and Jugoslavia both in area and production. The northern regions are particularly favourable to maize cultivation. The author explains how hybrids are produced and points out that so far only dent hybrids are being developed in Italy, as they are more productive than flint hybrids. Flint maize is preferred for human consumption and in many regions it meets with more favourable conditions than dent maize. With regard to the controversy on the value of hybrid maize, the author explains that objections to this type in Italy have arisen largely because dent hybrids were grown in areas where flint hybrids would have been more suitable.—E.B.

422 De Rosa, M. I mais ibridi nell'Avellinese. [**Hybrid maize in the province of Avellino (Campania)**] *G. Agric. Domen.* 1950, **60**, 11.

Although an average increase in production of 30 per cent was obtained from hybrid maize in the first year's trials, when compared with local varieties, local farmers are unwilling to grow hybrid maize because its flour is said to be unsuitable for human consumption and also because of the high cost of renewing its seed every year.—E.B.

423 Volanti, U. I granoturchi ibridi americani nel giudizio dell'Ispettore agrario di Brescia. [**The opinion of the agricultural supervisor of Brescia on American maize hybrids**] *G. Agric. Domen.* 1949, **59**, 335-6.

Although in the province of Brescia these hybrid varieties, particularly the early types, were on the whole successful, yet in many cases they gave poor results. Only a few types, such as U.41, medium early, and U.S. 13, late, should be maintained. American varieties are more susceptible to pests than are local varieties. Some recommendations are made. Sowing rate should be five plants per sq. m.—E.B.

424 Fabiani, L. Mais nostrani e mais ibridi americani. [**Local maize varieties and American hybrid maize.**] *Humus, Milan* 1950, **6**, 7-8.

This article is a further contribution to the question of whether it is advisable to grow hybrid maize in Italy. In field trials carried out in the province of Como, local and hybrid varieties were compared at 400 m. above sea level on non-irrigated land of low to medium fertility receiving only mineral fertilizers. Conclusions are summarized as follows: (a) Of the local varieties, “San Pancrazio” and “Nostrano dell’Isola” gave the highest yields (56.93 and 54.39 q. of dry matter per ha.) and proved drought resistant; (b) in a field of higher fertility, in comparison with the two above varieties, only U.32 gave a higher yield, followed by the other hybrids; (c) in a field of lower fertility, yield of the hybrids was 20 to 25 per cent higher than that of the local varieties; (d) the hybrid varieties show a high percentage of dwarf plants. —E.B.

425 Stonor, C. R. and Anderson, E. **Maize among the hill peoples of Assam.** *Ann. Mo. bot. Gdn* 1949, **36**, 355-95.

Collections of indigenous types of *Zea mays* made by the first author have been grown, pressed, measured and photographed in Assam. Samples of the same varieties were grown by the second author at the California Institute of Technology, and were treated similarly. Ethnological, linguistic, distributional, morphological and cytological evidence is here set out objectively.

The varieties and uses of maize are enumerated tribe by tribe. The crop, as grown in Assam, is usually sown in lines or patches, or even as single plants, among other cereal crops. In spite of this practice, the varieties are kept remarkably pure, even when five or six distinct types are grown by a single village. There are considerable differences between the Assamese varieties (most of which are remarkably uniform within the variety). As a whole they tend to have: slight or no plant colour, many short internodes, semi-included tassels, pathe-like upper leaves, pendent tassel branches, everal small ears, long slender leaves, short silks, dull aleurone colours, small subspherical kernels. They are outstanding, both in Assam and in America, for their lack of vigour. This complex of characters is unknown in Mexico and Central America. In South America it is approached only in mixtures from the eastern rivers and in certain primitive popcorns. In prehistoric times, varieties with similar cobs and kernels were the only types of maize grown along the west coast of South America for a long period. The distribution of hese and similar varieties in the Orient is reviewed. They are widely, though sporadically, distributed rom Persia and Turkestan to Tibet and the Island of Hainan, nearly always among primitive and conervative peoples.

It is concluded that there have been at least wo major movements of maize in Asia. The later one, in early post-Columbian times, brought what is ssentially a Caribbean type of maize to the Philippines and to many of the countries actively colonized by the Europeans. Back in the hills, however, there are more primitive types whose progenitors must have crossed the Pacific in pre-Columbian times, though in which direction (or directions) the evidence does not indicate. The possibility of trans-Pacific transfer of a primitive and unaggressive race of maize by early Polynesians is discussed. It is shown to parallel the conclusions reached by the most recent workers on cotton. For the study of such problems, the imperative need for more critical taxonomic evidence on cultivated plants and weeds is discussed and illustrated by examples. —Adapted from authors’ summary.

426 Sen, B. **Trials of U.S.A. hybrid corn (maize)** *Curr. Sci.* 1949, **18**, 213-5. [Vivekananda Lab., Almora, U.P., India.]

Average yields per plant from the hybrid maize were in all cases much greater than those from the local Almora variety, and in one case amounted to a more than ten-fold increase.—M.E.E.

427 Lonnquist, J. H. **The development and performance of synthetic varieties of corn [maize].** *Agron. J.* 1949, **41**, 153-6.

The development of two synthetic varieties of corn from ‘Krug yellow dent’ is reported; these were tested for yield and resistance to lodging and gave values significantly different from the unselected parental material. In the third generation yields were substantially higher than in the second.—R.N.H.W.

428 Cutler, H. C. **Races of maize in South America.** *Rev. Agric. Cochabamba,* 1948, **5**, No. 4, 18-29. [Harvard Univ., U.S.A.]

Authorized translation into Spanish by M. Cárdenas of work originally published in *Bot. Mus. Leafl. Harv.* Vol. 12. No. 8. 1946.—G.M.R.

Seeds

429 Koopman, C. Het drogen van maïs. [**The drying of maize.**] *Maandbl. LandbVoorl-Dnst* 1949, **6**, 539-43. [Director, Cent. Bur. Pl. Breed. Sta., Hoofddorp, Netherlands]

Discussion of the amount of heat required for the drying of fresh maize cobs shows this process to be disproportionately costly for use in the Netherlands, where air-drying in racks or rack-drying for a short period followed by threshing and drying in an ordinary grain drier is preferable. In order to avoid injury to the germination capacity of maize, a lower drying temperature is required, especially at the beginning of the process, than for small grain. In America a temperature of 30 to 38°C. is used, but fodder maize may be dried at 70 to 80°C.—G.M.R.

Diseases and Pests

430 Pasinetti, L. Lotta contro la batteriosi del mais in Italia. [**Control of bacterial wilt of maize in Italy.**] *Humus, Milan* 1949, **5**, No. 10, 22-6. [Ist. Patol. veg. e Microbiol. agr. Univ. Palermo.]

The author, who has studied this disease since the time of its appearance in Italy in 1935, refers to trials in Milan on a number of maize varieties. The old Italian varieties, which have a vitreous grain with high gluten content, proved resistant, and the varieties with soft grain susceptible. Control must be obtained by selection of resistant varieties rather than by destroying the insects which are partly responsible for the propagation of the disease. [See also *Fld Crop Abstr.* 2, Abs. 485, 1949.]—E.B.

SORGHUM

Agronomy

431 Bartel, A. T. **Hybrid vigor in sorghums.** *Agron. J.* 1949, **41**, 147-52. [Agric. Res. Admin., U.S. Dept. Agric.]

Nineteen F_1 hybrids were studied. Grain and stover yields, plant height, leaf number, date of heading, amount of lodging, hundred-grain weight and silage composition were recorded. Information about chemical composition of the silage is inconclusive. It is difficult to make commercial use of hybrid vigour in sorghums until economical methods of seed production have been developed. [See *Plant Breeding Abstracts*]—R.N.H.W.

432 Artschwager, E. **Cytology of reproduction in *Sorghum vulgare*.** *J. agric. Res.* 1949, **78**, 659-72. [Div. Sug. Pl. Invest., Bur. Pl. Ind., Agric. Res. Admin., U.S. Dept. Agric.]

See *Plant Breeding Abstracts.*

Diseases and Pests

433 Ciccarone, A. **Zonate leaf spot of *Sorghum* in Venezuela.** *Phytopathology* 1949, **39**, 760-1. [Ministerio de Agricultura y Cría, Maracay, Venezuela]

This note concerns grain plots of *Sorghum vulgare*, and is the first report of *Gloeocercospora sorghi* in South America. Outside of the United States there is a previous record from Tanganyika, which seems to be based on sclerotia only.—M.H.

RICE

Agronomy

434 Coolhaas, C. Indrukken betreffende de rijstcultuur in Noord-Italië en in Zuid-Frankrijk. [**Impressions of rice growing in the north of Italy and the south of France.**] *Landbouwk. Tijdschr.* 1949, **61**, 736-40. [Lecturer, Dept. Trop. Crop Production, Univ. Wageningen]

An account is given of a tour through the rice cultures of the River Po plains and the Rhône delta. Interesting differences were noted between rice growing practice in Italy and France and between this and methods in Indonesia. In the Vercellese, the region situated between the Dora Baltea and Sesia, tributaries of the Po, rice is the principle crop and is grown under irrigation in rotation with wheat and grass or grass/red clover leys. Precautions taken to raise the temperature of the irrigation water are described. Most of the regional holdings are small. Research and breeding are in progress at the Rice Research Station at Vercelli. In the Mantova region holdings are larger: rice growing is not so firmly anchored here as in the Vercellese and tends to decrease under present low prices. It is grown once in 3 or 4 years in rotation with wheat, turnip seed, maize, potatoes, beet, grass and clover. Methods of cultivation and irrigation are described. In the Ferrara region rice is grown in reclaimed polders, irrigated, and in rotation with hemp (an important crop here), maize and grassland. The quality of the Italian rice is very good. In the part of the Rhône delta known as La Camargue, rice growing has been long established on a small scale. It has recently increased from 4000 ha. in 1948 to 6000 ha. in 1949. The culture is still more or less experimental, however, and the yield is lower than in Italy. Shortage of labour makes mechanization of greater importance, and weed control more difficult, than in Italy. Sowing is direct, either by hand under water or by machine into the mud. Red rice, which propagates itself so readily, is a source of trouble in this region and is controlled mainly by the careful choice of pure strains and by rotation with dryland crops such as vines, grass, lucerne. Rice selection is being carried out by the Montpellier Agricultural College at Merle.—G.M.R.

435 Gary, M. La culture du riz en Camargue. [**Cultivation of rice in Camargue**] *La Potasse* 1949, **23**, 82-5.

The cultivation of rice in Camargue had been abandoned because the cost of production was too high compared with that of the Asiatic product. After the last war, because of cessation of supplies from Asia, rice was again cultivated, at first on an area of 500 to 600 ha. and by 1949, 8000 ha. The yield is about 10,000 tons but the requirement for Paris alone is 70,000 tons per year. The Government gives a guaranteed price. Mechanization reduces costs of production and high yields of excellent quality rice are obtained. The question of manuring is discussed. Sandy soils still present a problem in this respect.—D.B.

436 CORBELLINI, Ida Casi agronomici difficili. [**Difficult agronomic problems**] *Humus, Milan* 1949, **5**, No. 12, 33. [Ist. Agron., Univ. Milano]

An area of 2 ha. kept for a long time under meadow, vas sown with rice after ploughing. As the crop vas poor, ammonium sulphate was applied in the niddle of June. Growth then became luxuriant. Ripening appeared to take place at the normal time out the ears, which were still erect, contained withered stamens and ovaries and no grain; ferilization had not taken place. Reference to the ' Analytical Key of the alterations of rice due to sterility of the spike" given in *Atti Ist. bot. Pavia* 1945) indicated that the sterility in question was lue to an excess of soil nitrogen. To obviate such oss, advice is given on the procedure for growing ice immediately after ploughing an old meadow. —E.B.

37 NOVELLI, N. Storia del trapianto del riso. [**History of transplanting of rice.**] 1945. pp. 46. [Vercelli, Sta. sper. Risicoltura]

Jp to the beginning of this century rice cultivation n Italy involved broadcast sowing, repeated weedng, a long period of submersion, a very limited rotaion, and the maximum of hard work. The author ssisted in the introduction of row sowing which llows, in part, mechanized weeding. He then adocated transplanting and in 1909 studied this nethod in Spain. The numerous advantages of ransplanting are described; they include the ossibility of growing two crops in the same year, vith higher forage production. It is reckoned that t present transplanting is effected on 60,000 ha. of he 150,000 ha. under rice in Italy and that the ractice is extending. The major obstacle is the arge amount of labour required. The problem of nechanical transplanting has not yet been solved. —E.B.

38 ALPE, A. Trattrici in risaia. [**Tractors in the rice field**] *Ann. Sper. agr.* 1949, **3**, n.s. 1153-9. [English summary, 1159] [Milan, Ist. sper. Meccan. agr.]

loughing experiments with three different tworiving wheel tractors have confirmed that direct action on muddy soils is unsatisfactory. The se of ploughs worked by cable should be developed. —E.B.

39 MARTYŠEV, F. G. [**Combined rice-fish farming**] *Sovet. Agron.* 1950, No. 1, 29-32. [Russian] [Timirjazev Acad. Agric., Moscow]

he introduction of carp into irrigated rice fields as in many instances resulted in an increase in the eld of rice amounting to 6 to 8 centners per ha., and more. In its search for food the carp comminutes the soil, and, by breaking the film on the surface of the water, makes oxygen available to the plant roots. It consumes the rice midge (the most serious pest of rice) and the weed seeds which fall into the water. It also manures the rice with its excrement.—R.P.J.

440 GUPTA, P. S., and MITRA, A. K. **Possibilities of increasing the yield of rice by ratooning in the United Provinces.** *Indian Fmg* 1948, **9**, 13-5.

These studies have been made at the Rice Research Station, Nagina, using the variety T.N. 32. Two groups were sown, one left to ratoon under irrigation, the other under unirrigated conditions. (More than 90 per cent of the paddy crop is dependent on monsoons). The first crop gave a 31 maund per acre yield [1 maund=$82\frac{2}{7}$ lb.] Following this, the ' irrigated' ratoon crop gave 9 per cent of the first crop as against the 'unirrigated' ratoon's 3 per cent. In trials to study the effect of delayed sowing of a rabi crop on yield, results show that the increase in yield by ratooning is very small, variable, and advantageous only in areas where a single crop of early paddy is taken and where the soil has sufficient moisture to sustain a ratoon crop.—E.B.H.

441 HARTLEY, C. W. S. **Investigations into the mechanical cultivation of wet padi 1948-1949. A general review.** *Malay. agric. J.* 1949, **32**, 141-51.

In attempting to introduce the mechanical cultivation of wet padi, both the agronomic problems involved and the purely constructional and engineering aspects are being investigated. For the cultivation of deep peat areas with wet conditions, special wheels or extensions and a more suitable disc harrow need to be designed. The standard Fordson steel wheels were efficient for the dry and firm bottom areas. Post-ploughing cultivation presents the greatest problem and requires the evolution of wheels to enable tractors to draw harrows and rollers over ploughed and flooded land. The necessity of making provision for the variations in soil conditions even within the hard pan areas has also been demonstrated. Further research is required into the desirability of wet or dry cultivations, the best system of drainage and of sowing seed and the effect of the new methods used on weed growth. More is likely to be gained by the introduction of mechanical cultivation into new areas than its introduction into the already established ones where the present system of ownership, population distribution, and field lay-out would create many difficulties.

A programme of further experiments is outlined.—A.D.H.

442 Ashby, H. K. **Wet padi mechanical cultivation experiments in Kelantan, season 1948-1949.** *Malay. agric. J.* 1949, **32**, 152-69. [State Agric. Officer, Kelantan and Trengganu]

Yields in Kelantan are very low, and a growing population necessitated an investigation into the possibility of obtaining heavier yields per acre. Experiments were laid down in randomised blocks to test the effect of depth and time of ploughing on yield. Deep ploughing gave better weed control than shallow ploughing, and late ploughing was better than early but the methods of mechanical cultivation adopted have not in the first season increased wet padi yields. Results suggest that some factor inversely related to depth of ploughing has depressed yields. Further experiments into the effect of depths of after-harvest ploughing and off-season cropping showed that water consumption during the padi season did not appear to differ visibly between deep and shallow-ploughed plots and seemed normal though the land had been worked dry. Weed control was again better with deep ploughing but took longer. There were no significant differences in yield as a result of depth of ploughing or off-season cropping. Trials on smallholdings revealed that in common with all deep cultivated plots of both wet and dry padi, there was a lengthening of the maturation period, and uneven ripening where deep mechanical cultivation was used. Yield differences were again insignificant. These experiments indicate that the effect of mechanical cultivation on the yield of padi has been negligible.—A.D.H.

443 Ashby, H. K. **Dry padi mechanical cultivation experiments, Kelantan, season 1948-1949.** *Malay. agric. J.* 1949, **32**, 170-84.

Yields from dry padi cultivation are lower than from wet, but where irrigation is not possible, the cultivation of dry padi land can be interspersed with that of areas of wet padi to produce additional crops.

Pre-war experiments suggested that highly significant increases in yield were possible from deep cultivations particularly if done shortly before harvest. Experiments similar to those tried for wet padi confirmed the results of pre-war trials. Though in August and September, there were no visible differences as a result of variation in the depth of ploughing, by October, the deeply cultivated plots were superior in height, colour of seedlings, and in weed control. Deep cultivations apparently had considerable residual effects and influenced yields over a period of some years. On the other hand, deep ploughing tends to increase seedling failure. However, less time spent in weeding, and increased yields should largely compensate for this increase in labour time. Off-season cropping experiments were not possible but pre-war experience suggested that such cropping increases yields. Trials in seed sowing indicated that mechanical methods give high yields but are not as satisfactory for weed control and inter-cultivation as the local method of dibbling.—A.D.H.

444 Coleman, P. G. **Investigations into the mechanical cultivation of wet padi in Province Wellesley during the season 1948-1949.** *Malay. agric. J.* 1949, **32**, 185-99.

Investigations into the effect of depth of ploughing on yield showed no significant results. In all tests there was a general indication that mechanical cultivation was better than buffalo cultivation. A detailed description of trials with different types of mechanical cultivators, and of the modifications necessary in them is given.—A.D.H.

445 Jones, D. G. **Mechanical cultivation experiments with wet padi at Pulau Gadong Padi Experiment Station, Malacca, in 1948-1949.** *Malay. agric. J.* **32**, 200-7, 1949.

There were no statistically significant differences recorded in the type of ploughing and time of ploughing trials, but there were fewer weeds on plots ploughed to a depth of 8 in. There was no difference between the treatments in transplanted padi. Apparently better results would be obtained from drilling the seed with 14 inch spacing between the rows, and a smaller seed rate per foot run of drill. It is thought that, in future experiments, ploughing in March, immediately after harvest, may give better results than ploughing in April.—A.D.H.

446 Allen, E. F., and Bewlay, E. W. **Investigations on the mechanical cultivation of padi at Chenderong Balai, 1948-1949.** *Malay. agric. J.* 1949, **32**, 208-22.

From experiments made on soils similar to bog soils in Malaya potentially suitable for padi cultivation, it was concluded that mechanical cultivation of these soils is a practical proposition if underground stumps and timbers are removed. If initial cultivation is planned to destroy off-season weed growth, production of a good seed-bed is simple. Sowing can be done with a seed drill, but further investigation is needed into the best method of irrigation after germination. Provided insect pests, especially mole crickets, can be controlled, the best system is possibly that of keeping the fields dry for 4 or 5 weeks. The only sound method of reducing hand-weeding is thought to be efficient water control coupled with a close even stand of padi. Weed killers have little effect on sedges. Though broadcasting on water is effective in California, on wet peat it gave poor results, possibly due to the high proportion of organic matter. One complication encountered was the liability of stagnant water to produce anaerobic conditions. For further progress in mechanical harvesting improvement in drainage is the first essential. Results of trials with different types of tractors are given.—A.D.H.

Varieties

447 Piacco, R. Una nuova razza di riso "Franco Roncarolo" [**A new rice variety "Franco Roncarolo"**] *G. Agric. Domen* 1949, **59**, 377.

After a period of cultivation rice varieties in Italy degenerate and new varieties must be introduced. The present cultural tendency is towards varieties which combine earliness (vegetative cycle 150 to 155 days) with productivity and lodging resistance. The new variety described ("Lady Wright" × "Ardito") appears to meet these requirements.—E.B.

448 Piacco, R. Risi italiani. [**Italian rice varieties.**] *Ital. agric.* 1949, **86**, 632-6.

About forty varieties are at present cultivated. These are grouped by the author into five categories according to the size of the grain. "Americano 1600," which has a long vegetative period, is grown on 70 per cent of the total area, followed by "Maratelli" (7.2 per cent), "R.77", "R.B.", "Vialone", etc.—E.B.

Seeds

449 Naundorf, G., and Villamil, G., F. Poder selectivo del 2,4-D. Contribución a la lucha contra el arroz rojo. (Nota preliminar.) [**Selective capacity of 2,4-D. Contribution towards the control of red rice. (Preliminary communication.)**] *Notas agron. Palmira* 1949, **2**, 70-81. [English summary, 79-80.] [Agric. Exp. Sta., Palmira, Colombia.]

The germination of the white rice, Lady Wright (Palmira 8), was compared with that of red rice under different concentrations of 2,4-D in the greenhouse and in the field. Figures are given which indicate that white rice is much less sensitive and can tolerate concentrations which destroy red rice. The experiment continues with a view to reducing the concentrations while achieving the same results.—G.M.R.

450 Rhind, D. **Testing paddy seed for purity by the method of sequential analysis.** *Trop. Agriculturist* 1948, **104**, 91-4.

Examples are given to show how to use two sampling tables, in which different probability levels are fixed for the rejection of a good sample (P = 0.01) and for the acceptance of bad sample (P = 0.05). The method of constructing these tables is not indicated.—G.K.G.C.

Fertilizers

451 John, T. J. **Green manure.** *Indian Fmg* 1949, **10**, 60-1. [Mangalam Estates Ltd., Perumbavoor]

The nitrogen content of twelve green manures generally used in south India for increasing rice production is presented. *Cassia auriculata* with 2.1 per cent N content ranks highest in the table, followed by *Dodona viscosa* and *Tephrosia candida*. The outstanding advantages of *Phaseolus trilobus* are discussed and instructions are given on correct methods of applying green manures, bonemeal and stable manure.—M.E.E.

LEGUMES

MISCELLANEOUS

452 Becker, W. R. Peulvruchten. [**Pulse crops.**] *Versl. Cent. Inst. Landbouwk. Onderzoek* 1949, **1948**, 58-60. [Cent Inst. Agric. Res., Wageningen, Netherlands]

Experiments during 1948 were concerned with : (1) time of harvesting. In peas quality appeared to be improved by harvesting early, when the straw was still more or less green, while the crop did not necessarily suffer in quantity thereby. In beans (*Phaseolus*) it was found that early harvesting causes little reduction in yield when the weather, as in 1947, promotes rapid ripening ; but when the crop matures slowly, as in the wet summer of 1948, there is a steady increase in yield as harvesting is postponed (five dates from 7 Sept. to 11 Oct. tested). (2) Planting distance and seeding rate. Tests of seed rates ranging from 100 to 260 kg. per ha. showed yield to increase with seed rate up to 200 kg. per ha., and even 260 kg. per ha. was not too heavy a rate. Tests of planting distances ranging from 25 cm. to 50 cm. have up to the present given better results from smaller distances between the rows, and the heavier the seed rate, the more does yield suffer from widening the planting distance. (3) Treatment of flowering beans (*Phaseolus*) with growth-regulating substances to prevent the fall of flowers and fruits and so increase yield. Different concentrations of two preparations were tried, and in several plots the ripening of the leaves was very considerably retarded and new additional flowers were formed while the pods of the first flowers were already ripe on the plants. The experiment continues. (4) Canning peas : sowing date in relation to harvesting date.—G.M.R.

Varieties

453 GENERALOV, G. F. [**Results of breeding and varietal tests of grain legumes.**] *Selek. Semenovod.* 1949, No. 2, 55-9. [Russian]
Summing up the results obtained at eighteen plant breeding centres of the U.S.S.R., the author lists twenty-three varieties of *Pisum*, thirteen varieties of *Ervum*, sixteen of *Phaseolus*, six of *Lathyrus* and eleven of *Cicer*. The regional distribution of these varieties is discussed.—M.A.O.

Diseases and pests

454 REID, W. D. **Control of halo-blight of beans.** *N.Z.J. Sci. Tech.* 1948, **30**, Sect. A. 45-8. [Dept. Sci. Ind. Res.]
In the 1945-46 and 1946-47 seasons, dwarf beans infected with halo-blight (*Pseudomonas medicaginis* var. *phaseolicola*) were treated with Bordeaux (6-8-100) and Cuprox (copper oxychloride, 5-100). Treatments consisted of two, three and four applications of each spray material. Because of low rainfall, incidence of halo-blight in 1945-46 was low but all treatments reduced infection to a small amount. In 1946-47 results showed that three and four applications reduced disease to a negligible amount but that two applications were not as effective. Bordeaux and Cuprox were of approximately equal value for control of halo-blight. Green-pod plus seed yields of treated plots were approximately double those of untreated plots.—Authors' summary.

LUPIN

Varieties

455 LAMBERTS, H. Lupineveredeling. [**Lupin breeding.**] *Versl. Cent. Inst. Landbouwk. Onderzoek* 1949, **1948**, 100-1. [Cent. Inst. Agric. Res., Wageningen, Netherlands]
Selection in *Lupinus luteus* continues, and among 300,000 plants of indigenous bitter yellow lupin seventeen plants with low alkaloid content have been found, some of which at least are believed to be genuine new forms and not escapes from cultivated sweet lupin. Work is proceeding in co-operation with German workers.—G.M.R.

SOYBEANS

Seeds

456 LIU, HOU-LEE. **Inheritance of defective seed coat in soybeans.** *J. Hered.* 1949, **40**, 317-22. [Illinois Agric. Expt. Sta.] See *Plant Breeding Abstracts*.

457 ROMAGNOLI, M. Note relative a ricerche compiute sulla coltivazione della soia in Italia [**Research on soybean cultivation in Italy.**] *Riv. Agric. subtrop. e trop.* 1949, **43**, 154-60. [English summary, 160]
Information is supplied on oil and protein content from trials carried out in Central Italy for many years with different soybean varieties. Oil content shows greater variability than protein content. With earlier sowing, protein decreases while oil increases (time of sowing varies from 15th April to 10th June). High temperatures have not a great influence on oil content, but medium and especially low temperatures have greater effect.—E.B.

458 ARNOLD, L. K. **New equipment for extracting soybean oil with trichloroethylene.** *Soybean Digest* 1949, **9**, 11-3. [Iowa Sta. Coll., Ames]
The Iowa State College Research Foundation, Inc. has patented a new solvent extraction plant for soybeans, using non-explosive, non-inflammable trichloroethylene. An illustrated description of the plant is given, also a diagram of the extraction process. Operation is automatic and simple and the beans need no preliminary drying.—E.B.H.

ROOT CROPS

BEET

Varieties

459 WARNE, L. G. G. **Growth of mangels and long beet.** *Nature, Lond.* 1950, **165**, 29-31. [Bot. Dept., Univ. Manchester]
The association in beet plants between upward growth of the main root, lateral roots, and wilting of leaves is discussed with special reference to beet varieties.—M.H.

SUGAR BEET

Agronomy

460 HARVEY, P. N. **Effect of rainfall on sugar beet tonnage.** *Brit. Sug. Beet Rev.* 1949, **18**, 19-21. [Norfolk Agric. Sta.]
The fact that sugar production in England is not dependent on bright sunshine has been clearly demonstrated in the contrasting seasons of 1947 and 1948. However, the combination of high

temperature and low rainfall produces a low tonnage of roots, but with abnormally high sugar content. Rainfall is, therefore, a determining factor, in spite of the fact that the taproot makes the beet plant resistant to long periods of drought. Trials on crop development during the lifting season, and the relative yield and changes in sugar content from mid-September to December over a period of years are recorded. Certain broad deductions are made, which are considered valid for most years, excepting those abnormally dry. In general, the increase during September is at the rate of 10 cwt. washed beet per acre each week, showing a 1 per cent increase in sugar content. The corresponding increments for October and November are 5 cwt. and 2.5 cwt. respectively. Sugar content shows only a slight increase in October, but declines gradually during the following month, although showing peak production in mid-December when crop yield rises slightly. Any slight increase in tonnage of washed beet is offset by a declining sugar percentage after this period. Minor fluctuations are unavoidable, since heavy rains and good growing conditions before lifting tend to depress sugar content temporarily. Conversely, a spell of dry weather has the opposite effect.—M.L.Y.

461 AGRICULTURAL ENGINEERING RECORD. **Accuracy of topping sugar beet by hand.** *Agric. Engng Rec.* 1949, **2**, 211.

Comparisons of average topping performance under a wide range of conditions provide a better standard of accuracy than comparisons confined to machines working on the same field. A study of the efficiency of hand topping in different parts of England has recently been made by the National Institute of Agricultural Engineering in cooperation with the British Sugar Corporation: the results provide useful standards.—M.L.Y.

462 AGRICULTURAL ENGINEERING RECORD. **Sugar beet loading.** *Agric. Engng Rec.* 1949, **2**, 216-17.

A comparison is made of hand and mechanical methods of loading; labour requirements are noted in each case. Although the fastest method is the tractor-drawn power-driver implement, the advantage is outweighed by the size and capacity of the labour team required. The use of a mechanical loader working from windrows with a large team appears to be justified only when speed is the first consideration. When each man loaded and unloaded his own cart by hand, the output per man-hour was high and the work continuous. This was clearly demonstrated when hand loading was carried out early in the season from wide windrows. —M.L.Y.

463 DECOUX, L. La mécanisation de la culture de la betterave. Les expériences des deux dernières campagnes. [**Mechanization of cultivation of the sugar beet. Experiments of the past two years, 1946 and 1947.**] *Publ. Inst. belge Amélior. Better.* 1948, **16**, 103-165.

See *Fld Crop Abstr.* 2, Abs. 654 and 655.

464 DECOUX, L. L'évolution de la méthode de préparation superficielle du sol, en relation avec le semis précoce. [**Shallow cultivation of the soil in relation to early sowing.**] *Publ. Inst. belge Amélior. Better.* 1948, **16**, 83-100. [Inst. Belge pour l'Amélioration de la Betterave, Tirlemont]

Most of the work of preparing the land is done in the autumn. It consists of application of farm manure and chemical fertilizer, and of ploughing. All that has to be done in the spring is to work the land to a depth of about 2 in. The various ways of carrying out this method of cultivation, yields obtained, costs, advantages and disadvantages are discussed. Soil permeability tests showed that a better soil structure is obtained by shallow cultivation than by using the cultivator.—D.B.

465 DECOUX, L. Étude de la culture de la betterave sucrière et son avenir en Belgique. [**Sugar beet cultivation and its future in Belgium.**] *Publ. Inst. belge Amélior. Better.* 1948, **16**, 169-93.

466 ROUBAIX, J. de, and MARECHAL, R. Type de sol et rendement en betterave sucrière. [**Soil type and yield of sugar beet**]. *Sucr. belge* 1950, **69**, 177-89. [Raffinerie Tirlemontoise (J. de R.) and Univ. Gand (R.M.)]

467 PANELLA, A. Consumi idrici e metabolismo nella barbabietola da zucchero. [**Water consumption and metabolism of sugar beet.**] *Industr. saccar. ital.* 1950, **43**, 1-8. bibl 7. [Ist Agron., Univ. Perugia, Italy]

In this trial carried out at Perugia, sugar beet plants were grown in cement containers, half of which received a water supply equal to the quantity daily absorbed, while the other containers received half this quantity. Sowing took place on March 23rd. Plants were thinned to four per container. In comparison with the first group, metabolic activity and growth rate of the plants grown with the lower water supply appeared to be reduced in the early stages of development, but in later stages, although signs of wilting were apparent, metabolic activity increased as a result of the reaction of the plant to conditions of high summer temperature and drought. In the plants with complete water supply, increase of dry matter during the second half of July was over three times that of the second group of plants. During this period a plant requires over 0.5 litre of water per day.—E.B.

468 BORGHI, M. Le perdite di zucchero nelle bietole lesionate. [**Sugar losses with injured beets.**] *Industr. saccar. ital.* 1949, **42**, 252-7. [Lab. sper. Soc. Produttori Zucchero]

The author concludes that sugar beet after being injured and remaining for 3 or 4 days on the field, has its original sugar content of 16 per cent reduced to 15.75 to 15.85 per cent. To calculate total sugar loss, an average of 15 per cent of beets is assumed to have been injured in the process of lifting the crop from the soil.—E.B.

Varieties

469 THOMPSON, E. G. **Sugar beet strains.** *Brit. Sug. Beet. Rev.* 1949, **18**, 31-2. [Nat. Inst. Agric. Bot.]

Results of trials carried out in every factory area through the co-operation of the British Sugar Corporation and the National Institute of Agricultural Botany, Cambridge, are summarized. These include direct comparison between three stocks (Klein E and two Kuhn stocks) of seed obtained from Europe, and their equivalent strains which were maintained in Great Britain throughout the war. It is evident that these are up to the standard of those raised on the continent, if not slightly better. Although sugar beet strains are commonly described as: E, low; N, medium; or Z, high sugar types, the average difference in sugar content in the E and N strains tested was less than 1 per cent each year. Considering the two years together and excluding Continental stocks, 'Sharpes' Klein E', 'Marsters', and 'Webbs's No. 2' showed the least bolting.—M.L.Y.

470 WAUTHY, R. Les variétés de betterave sucrière en Belgique de 1943 à 1947. [**Varieties of sugar beet in Belgium, 1943-1947.**] *Publ. Inst. belge Amélior. Better.* 1948, **16**, 283-8.

Performance of about forty varieties is presented in four tables. Varieties are recommended for high sugar yield and for resistance to bolting. Disease resistance and germination have also been studied in these field trials.—D.B.

471 WAUTHY, R. Les variétés de betterave sucrière en Belgique de 1944 à 1948. [**Varieties of sugar beet in Belgium from 1944 to 1948.**] *Publ. Inst. belge Amélior. Better.* 1949, **16**, 175-202. [Inst. Belge pour l'Amélioration de la Betterave, Tirlemont]

Varieties are recommended on the basis of sugar yield per ha. (during the years 1944-48 inclusive) and of resistance to bolting (1945-49). Varieties have been placed in four classes according to the relationship between yield of roots by weight and the sugar content of the root. There are brief notes on varieties now grown in Belgium and in other countries. The results of these field trials are recorded in nine tables.—D.B.

Seeds

472 GUERILLOT, J., GUERILLOT-VINET, Mme J., MOREL, R. Germination comparée au laboratoire et en plein champ de glomérules de betteraves segmentés nus et enrobés. [**Comparative germination, in the laboratory and in the field, of segmented seed of the beet, both uncoated and coated.**] *Ann. agron., Paris* 1949, **19**, 574-7, bibl. 5. [L'École Nationale d'Agriculture, Grignon]

In France, previous attempts at coating segmented seed have not given satisfactory results. When a special clay from Allier was used as the base of the coating material, laboratory tests showed that coated seed was slower to germinate than was uncoated seed, but that finally the same percentage germinated. Field tests confirmed the satisfactory percentage germination with this coating and gave evidence of root yield and sugar content equivalent to that of uncoated seed.—D.B.

473 SIMON, M. L'influence de quelques traitements de la graine de betterave sucrière sur la conservation de ses facultés germinatives. [**The effect of seed treatment on the germinating capacity of sugar beet seed.**] *Publ. Inst. belge Amélior. Better.* 1948, **16**, 219-22.

Seeds were treated with two mercurial disinfectants some under dry and others under moist conditions. Those seeds treated by the dry method retained their germinating capacity after 21 months.—D.B.

474 CORDERO di MONTEZEMOLO, M. Impiego dei fitormoni per il trattamento dei glomeruli e per il trapianto dei planchons di bietole. [**Use of plant hormones for treating seed clusters and for transplanting stecklings of sugar beet.**] *Industr. saccar. ital.* 1949, **42**, 311-4.

In field trials carried out by the Agronomy Institute of the University of Bologna, four commercial preparations were tested. By treating stecklings with the hormone preparation at transplanting time there was only a slight increase in production of seed balls. Further trials are required for verification. Significant increases which occurred in some of the plots were attributed to the action of tap water and clayish mud supplied to the stecklings at transplanting time. Controls transplanted in the usual way showed no increase. By treating beet seeds for root production with the hormones in question, no increase in root or sugar yield per unit area was observed.—E.B.

Fertilizers

475 SIMON, M. La fumure minérale de la betterave sucrière, dans les conditions belges de production. [**Mineral amendments for the sugar beet for conditions in Belgium.**] *Publ. Inst. belge Amélior. Better.* 1948, **16**, 249-58.

After summarizing the value of farm and green manures the requirements of the sugar beet for nitrogen, phosphorus, potassium, sodium, and magnesium are discussed in relation to yield of roots and tops. Land used for sugar-beet cultivation in Belgium appears to be adequately provided with minor elements except boron, lack of which causes heart rot.—D.B.

476 AUDIDIER, L. Le sodium et le potassium dans l'alimentation de la betterave. [**Sodium and potassium in the nutrition of the beet.**] *La Potasse* 1949, **23**, 48-51.

Tables show that with potassium fertilizer there is an increase in the yield by weight of roots, an increase in density of roots, sugar content, and yield of sugar per ha., but there is a decrease in the yield of tops. This last is accounted for by the earlier maturity attained when potash is supplied.—D.B.

Machinery and Equipment

477 FARM MECHANIZATION. **Sugar beet harvesters.** *Farm Mech.* 1949, **3**, 232-4.

Current demonstrations of harvesting machines have shown decided improvements in: quality and speed of mechanical toppers, top preservation, provision for small-acreage farms. There is a tendency to favour less cumbersome machines. It is noticeable that the best work is being done by machines equipped with single or multiple vertical disc feelers and a horizontal cutter, the latter being in the form of a stationary blade or discs. Reference is made to different methods of topping and to production models and prototypes. One make is highly commended for its delicate topping mechanism.—M.L.Y.

478 BALLU, T. État de l'avancement en France de la mécanisation appliquée á la betterave sucrière. [**Progress in France regarding mechanization of sugar beet cultivation.**] *Publ. Inst. belge Amélior. Better.* 1948, **16**, 271-5.

479 PUBLICATIONS DE L'INSTITUT BELGE POUR L'AMÉLIORATION DE LA BETTERAVE. Les conclusions des démonstrations de mécanisation de la culture de la betterave en 1948. [**Conclusions reached as a result of demonstrations held in Belgium in 1948 on the mechanization of sugar beet cultivation.**] *Publ. Inst. belge Amélior. Better.* 1948, **16**, 329-36.

480 DECOUX, L. Les conclusions des journées de mécanisation de la culture de la betterave sucrière en 1949. [**The 1949 demonstration of the mechanization of sugar beet cultivation.**] *Publ. Inst. belge Amélior. Better.* 1949, **17**, 155-73. [Flemish and English summaries pp. 172-3] [Inst. Belge pour l'Amélioration de la Betterave, Tirlemont]

Diseases and pests

481 ERNOULD, L. Les maladies et les ennemis de la betterave en Belgique en 1946 et 1947. [**Diseases and pests of the sugar beet in Belgium in 1946 and 1947.**] *Publ. Inst. belge Amélior. Better.* 1948, **16**, 57-9, and 61-8. [Flemish and English summaries, 60 and 68]

482 ERNOULD, L. Les ennemis et maladies de la betterave, en Belgique, en 1948. [**Diseases and pests of the sugar beet in Belgium in 1948.**] *Publ. Inst. belge Amélior. Better.* 1948, **16**, 313-9. [Inst. belge pour l'Amélioration de la Betterave, Tirlemont]

The paper reviews diseases which have been caused by adverse climatic conditions, bacteria, viruses, insects, and mineral deficiency (boron and magnesium). Plants suffered quite definite morphological changes as a result of hormones having been carried by the wind, though originally used to kill weeds of other crops.—D.B.

483 ERNOULD, L. Monstruosités anatomiques produites sur la betterave par certains désherbants sélectifs. [**Anatomical abnormalities in the sugar beet caused by some selective herbicides.**] *Publ. Inst. belge Amélior. Better.* 1948, **16**, 321-3. [Inst. Belge pour l'Amélioration de la Betterave, Tirlemont]

The beet plant is particularly sensitive to the selective herbicides 2, 4-dichlorophenoxyacetic acid and 2-methyl 4-chlorophenoxyacetic acid. In view of accidental damage (the nature of which is described) caused by wind-blown herbicides, various recommendations are made for applying these weed killers in such a way that sensitive crops will be safe from injury.—D.B.

484 Ernould, L. La lutte contre les taupins. [**Measures to combat the wireworm.**] *Publ. Inst. belge Amélior. Better.* 1948, **16**, 299-312. bibl. 39. [Inst. Belge pour l'Amélioration de la Betterave, Tirlemont]

Wireworm (*Agriotes* sp.) causes more damage to the sugar beet plant and its yield than does any other pest. It attacks the plant at all stages of development from germination to maturity. The nature of the damage is described and the effect, good or bad, of cultural conditions is discussed. Several chemicals have been used to combat the wireworm. In this paper the action of hexachlorocyclohexane is discussed.—D.B.

485 Ernould, L. Le traitement de la graine de betterave à l'hexachlorocyclohexane, en vue de lutter contre les taupins. [**Treatment of beet seed with hexachlorocyclohexane, as a means of controlling wireworm.**] *Publ. Inst. belge Amélior. Better.* 1949, **17**, 45-58. [Inst. Belge pour l'Amélioration de la Betterave, Tirlemont]

——— Nouvelles observations sur l'action du H.C.H. dans la lutte contre les taupins en 1949. [**Recent observations in 1949 on the action of hexachloro-benzene in the control of wireworm.**] *Publ. Inst. belge Amélior. Better.* 1949, **17**, 59

The first paper gives an account of the results of experiments carried out in 1948 on the effect of hexachlorobenzene on germination and seedling development. The second paper deals with manner and time of application and the effect of hexachlorobenzene on the rotation. Remarkable success has been achieved in an area of 5000 ha. which had been treated with this chemical before sowing with beet seed.—D.B.

486 Simon, M. La dissémination du nématode de la betterave dans les pays betteraviers. [**The spread of the beet eelworm in beet-growing countries.**] *Publ. Inst. belge Amélior. Better.* 1948, **16**, 223-30, bibl. 47

A survey carried out in 1947 has shown that *Heterodera schachtii* exists in Belgium, Bulgaria, Canada, Czechoslovakia, Denmark, Germany, Great Britain, the Netherlands, Poland, Portugal, Rumania, United States and the U.S.S.R. It probably occurs in France, but has not yet been observed in Ireland or in Switzerland. Instructions are given for limiting the spread of the beet eelworm.—D.B.

487 Simon, M. La désinfection du sol au moyen de fumigants volatils. Résultats du traitement, en 1947, d'une terre infectée de nématode de la betterave. [**Soil disinfection with volatile fumigants. Results of treatment, in 1947, of soils infected with the beet eelworm.**] *Publ. Inst. belge Amélior. Better.* 1948, **16**, 241-7, bibl. 12.

Preparations in which chlorine and bromine were the active constituents were used to destroy *Heterodera schachtii*. The effects of different concentrations of the chemicals on yields are tabulated.—D.B.

488 Simon, M. La lutte contre le nématode de la betterave par la désinfection du sol. [**Control of sugar beet eelworm by soil disinfection.**] *Publ. Inst. belge Amélior. Better.* 1949, **17**, 15-25. bibl. 21.

489 Ernould, L. La lutte contre la pégomye. Résultats des essais effectués à Tirlemont en 1947. [**Control of the beet fly. Results of experiments at Tirlemont in 1947.**] *Publ. Inst. belge Amélior. Better.* 1948, **16**, 47-55. [Flemish and English summaries, p. 55]

490 Ernould, L. L'atomaire linéaire : ses dégâts en Belgique en 1947 et nouvelles perspectives de lutte. [**The pigmy mangold beetle, *Atomaria linearis* : damage caused to the 1947 sugar beet crop in Belgium and new means of control.**] *Publ. Inst. belge Amélior. Better.* 1948, **16**, 33-45, bibl. 30 [Flemish and English summaries, p. 46]

491 Ernould, L. La lutte contre les larves du Capside : *Calocoris norvegicus* Gm. sur betterave. [**Control of larvae of potato bug, *Calocoris norvegicus* Gm. on beet.**] *Publ. Inst. belge Amélior. Better.* 1948, **16**, 325-7. [Inst. Belge pour l'Amélioration de la Betterave, Tirlemont]

The symptoms are described and illustrated. Dusting or spraying with DDT, preferably as an emulsion in oil or benzene hexachloride, has proved effective in destroying the parasites. Dusting or spraying with nicotine or rotenone was of little value.—D.B.

492 Ernould, L. Y aurait-il une nouvelle maladie à virus, de la betterave, en Belgique ? [**A new virus disease of beet in Belgium ?**] *Publ. Inst. belge Amélior. Better.* 1948, **16**, 277-81.

493 Tverskoĭ, D. L. [***Aphanomyces cochlioides* Drechs., the cause of black leg of sugar beet.**] *Doklady Vsesojuz. Akad. S-H. Nauk* 1949, No. 8, 9-18 [Russian]. [All Union Sci. Res. Inst. for Beet Farming]

Measures recommended to combat the disease include : the introduction of herbage rotations, well timed ploughing and spring cultivation, applications of organic and mineral manures, removal of weeds, an interval of 2 to 3 years between crops of sugar beet, sowing at the earliest possible date, liberal doses of phosphorus and potash at the time of sowing, drainage of swampy soils and frequent light harrowing before appearance of the seedlings, cleaning and cross blocking of beets as early as possible, investigation of available fungicides for soil disinfection.—R.P.J.

494 McKeen, W. E. **A study of sugar beet rootrot in southern Ontario.** *Canad. J. Res.* 1949, **27**, Sec. C. 284-311. [Domn Lab. Plant Path., Harrow, Ont.]

The present study was undertaken to determine the identity and relative importance of the causal organisms responsible for root degeneration in sugar beets and to study the factors influencing the severity of such diseases as might be found in Ontario.—Extract.

BRASSICA

Varieties

495 Horberg, Y. Weibulls Original Bangholm, stam 36. [**Weibull's Original Bangholm, strain 36.**] *Weibulls ill. Årsb.* 1950, **45**, 34-5.

Weibull's Original Bangholm, strain 36, surpasses the old strain 22 in average yield by 2.8 per cent in bulk and 6.2 per cent in dry matter. It has for swedes of the Bangholm type an exceptionally smooth, branch-free and fine root with an unusually small neck and well-developed top. It is resistant to club root disease and possesses good keeping qualities.—R.P.J.

Seeds

496 Olthoff, B. H. Enkele opmerkingen over de zaadteelt van Brassicas. [**Some observations on growing seed of the *Brassica* species.**] *Maandbl. LandbVoorlDnst* 1949, **6**, 392-97, bibl. 1, illus. [Govt. Advisory Officer for Fine Seeds, Netherlands]

The Netherlands acreage occupied by *Brassica* species increased greatly from 1946 to 1949. The ive principal species with their numerous varieties are listed, with notes on their chromosome number and some distinguishing characters. Information s given on the distances between cultures precribed by the Netherlands Seed Inspection Service o prevent cross-pollination between varieties. Some cases of confused terminology are elucidated. With some exceptions (named), the plants listed set seed in the second year, but flowering and seed setting can be induced in the first year by means of vernalization. *Brassica oleracea* varieties present the greatest difficulty to the seed grower, and research now in progress appears to indicate that lack of bolters is very frequently due to sowing too late in the previous year. Some other findings with regard to growing seed of *B. oleracea* are embodied in a short list of instructions, by following which a mean seed yield of 1000 kg. per hectare should be procurable. Calcium cyanamide has been tested for the control of *Stellaria media* in these seed cultures, with successful results.—G.M.R.

497 Schoorel, A. F. Zaadteelt van stoppelknollen. [**Turnip seed production.**] *Versl. Cent. Inst. Landbouwk. Onderzoek* 1949, **1948**, 70-2. [Cent. Inst. Agric. Res., Wageningen, Netherlands]

The performance of seed of five varieties vernalized for 40 days at approximately 2°C. was compared with that of similar untreated seed sown respectively on the 2nd, 9th and 16th March. Finally roots of the same five varieties which had been kept in cold chambers at 4°C. and over were planted on the 2nd March. Bolters were obtained from these roots, but the rotting of most of the roots themselves prevented satisfactory seed production. Vernalization accelerated bolting in all the varieties and the proportion of bolters was greatly increased. The five varieties differed considerably in their low temperature requirements, and this was seen in the difference in the percentage of bolters in the vernalized and untreated seed and in the time at which bolting began. In two of the varieties vernalization produced 100 per cent bolting and an early seed crop in plants from the two earlier sowings. This percentage was lower in the other three varieties. In three of the varieties vernalization resulted in a very satisfactory seed yield of about 800 kg. per hectare. The low temperature requirements of the other two varieties had apparently not been quite met. In some cases almost 100 per cent bolters were obtained from untreated seed also (Vorrang, sown 2nd and 9th March); but in most cases the untreated seed produced a very small percentage of bolters and a poor seed crop, presumably because the plants flowered too late. It appears that after a certain date turnips do not bolt, but die when they have accomplished the vegetative stage.—G.M.R.

Diseases and pests

498 Takahashi, W. M. **The morphology and host range of *Brassica nigra* virus.** *Amer. J. Bot.* 1949, **36**, 533-5, bibl. 10. [Univ. Calif., Berkeley]

CASSAVA

Agronomy

499 Bolhuis, G. G. Enkele voorlopige resultaten van een behandeling van cassavestekken met colchicine. [**Some preliminary results from colchicine treatment of cassava cuttings.**] *Landbouw, Buitenzorg* 1949, **21**, 528-34, bibl. 2. [English summary, 533-4.] [Gen. Agric. Res. Sta., Buitenzorg, Java]

Cuttings of various clones of *Manihot utilissima* were treated with a 0.1 per cent aqueous solution of colchicine. Even a 10-hour treatment proved effective. When the shoots from treated cuttings tended to become normal at a length of about 10 in., they were cut back to about 4 in. from the base to induce the growth of new shoots, the tissue of which was completely changed. These new shoots did not show any tendency to return to normal. The results of chemical analysis of root samples, counts of chromosome numbers and some data concerning the yield of the crop from normal and from treated cuttings are tabulated. Results are on the whole disappointing, but the experiments should be continued on a larger scale with non-poisonous cassava varieties suitable for food. Special attention should be paid to increasing the protein value of the roots.—From author's summary.—G.M.R.

500 Bravo, A. F. Cultivo de la mandioca. [**Cassava growing.**] *Almanaque Min. Agric., Argentina* 1949, **24**, 399-402.

Climate in the north of Argentina is ideal for growing cassava (*Manihot utilissima, M. dulcis, M. manihot*). More than 20,000 tons of starch are produced annually in Argentine from rice, wheat and maize, over 11,000 tons being exported, all of which might easily be replaced by starch made from the readily grown cassava root. A short exposition is presented of varieties, environmental requirements and cultural technique.—G.M.R.

Diseases and Pests

501 Bolhuis, G. G. Waarnemingen over de zg. mozaiek-ziekte bij cassava op Java. **Observations on the so-called mosaic disease of cassava in Java.** *Landbouw, Buitenzorg* 1949, **21**, 521-7, bibl. 6. [English summary, 525-7.] [Gen. Agric. Exp. Sta., Buitenzorg, Java]

Symptoms observed from 1930 to 1939 in *Manihot utilissima* in Java have been attributed to cassava mosaic, but the author adduces evidence to show that up to the present no cassava mosaic caused by a virus has ever occurred in Java : the symptoms recorded must have been caused by a drop in temperature.—G.M.R.

OIL CROPS

GENERAL

502 Lips, H. J., and Grace, N. H. **Canadian erucic acid oils. IV. Edible properties of fanweed (pennycress) oil and shortening.** *Canad. J. Res.* 1949, **27**, Sect. F. 311-17. [Nat. Res. Labs., Ottawa]

Thlaspi arvense (fanweed, pennycress, French weed, or stinkweed), a member of the Cruciferae, grows abundantly on the Canadian prairies, and 13 per cent of the weed seed screenings removed from grain crops consists of fanweed seed. The oil from such screenings is at present being extracted at Fort William, and uses are being sought for it. Fanweed seeds contain 33 to 35 per cent oil by weight. The oil is said to be similar in properties to rapeseed oil, and in Russia some consideration has been given to its use as an edible product.—Extract.

CARTHAMUS

Varieties

503 Chevalier, R. and Piat, J. Essais comparatifs de rendement de Carthame (1948). [**Comparative yields of *Carthamus* varieties.**] *C. R. Acad. Agric. Fr.* 1949, **35**, 86-8.

The value of *Carthamus*, not only as a source of oil but also as a protector for lucerne seedlings, is now fully recognized. A comparison is made of the small-seeded variety commonly grown in France up to the present, and the Bold des Indes, a larger-seeded type recently imported. Although the latter is more easily shelled and contains a high proportion of oil, its low yield makes it unprofitable. Results indicate that "Ordinaire Epineux" (prickly shell) and the smooth *Carthamus*, both well-established varieties characterized by good yield and resistance to rust, should continue to be cultivated in preference to Bold des Indes.—M.L.Y.

RICINUS

Fertilizers

504 Valentin, J. Le ricin dans notre culture expérimentale de Beaucouze. [**Castor oil bean.**] *La Potasse* 1949, **23**, 52-3.

In addition to ammonium sulphate and superphosphate, plots of *Ricinus* were given (a) no potassium (b) 200 kg. potassium chloride and (c) 400 kg. potassium chloride. Plants without potassium attained only one-third the size and produced less than one-third the amount of seed of those treated with potassium. There was little difference between plants in plots (b) and (c).—D.B.

Machinery and Equipment

505 Valentin, J. Égreneuse de ricin. [**Shelling of the castor oil bean.**] *La Potasse* 1949, **23**, 86.

A machine which works satisfactorily is described. A good shelling machine should make large-scale cultivation of *Ricinus* worth while.—D.B.

SESAMUM

Agronomy

506 Amargós, J. L. El ajonjoli : la planta que hace diagnosis del suelo. [***Sesamum orientale* L. : the plant which diagnoses the soil.**] *Rev. Agric., Puerto Rico*, 1949, **39**, 123-30. [Min. Agric. Cuba]

Sesamum orientale is chosen as an indicator plant because of its exacting soil requirements. The article is mainly concerned with methods of supplying soil deficiencies indicated by various symptoms in this plant.—G.M.R.

Varieties

507 Simons, H. M., Jr. **Sesame—new oilseed crop for the South.** *Better Crops with Better Plant Food* 1949, **33**, 13-5 and 47. [South Carolina Experiment Station, Clemson, South Carolina]

A non-shattering variety of *Sesamum* sp. has ecently been introduced into the breeding programme of the South Carolina Experiment Station n an effort to combine this non-shattering character with high yield, high oil content and the disease esistance of other varieties. Although excellently adapted to the climate and soils of the South, this rop has had no commercial importance in the past because of its high labour requirements at harvest ime. Preliminary experiments with the new, nonhattering strains have yielded good results when using an ordinary tractor-drawn corn binder. Sesame offers new possibilities as a future cash crop.—E.B.H.

HELIANTHUS

Agronomy

508 Becker, W. R. Zonnebloemen. [**Sunflowers.**] *Versl. Cent. Inst. Landbouwk. Onderzoek* 1949, **1948**, 63. [Cent. Inst. Agric. Res., Wageningen, Netherlands]

In the first trials of sunflower (*Helianthus annuus*) undertaken in the Netherlands, night frosts about May 21st damaged most of the plants sown at the end of March and some of those sown in mid-April, but plants sown at the end of April were uninjured. It is believed that early sowing is probably unsuitable under Netherlands conditions, and that manurial treatment, especially in the sandy lands for which the plant seems destined, must be adequate. Damage by birds was enormous, 40 per cent at Heino. Early threshing and subsequent drying might avoid some of this. Yield, in spite of unfavourable weather, was approximately 2000 kg. per hectare. The crop may be suitable for large mechanized farms on the reclaimed lands.—G.M.R.

509 Salvador, V. G. Estudio del proceso de madurez del girasol y la determinación de la mejor epoca para cosecharlo. [**Study of the ripening process in the sunflower and determination of the best time to harvest.**] *Agric. tec. Chile* 1948, **8**, 112-30. [English summary, 129-30.]

The varieties Kruglik and Gray Striped sown 11.10.44 were grown near Santiago, Chile, and harvested in the case of Kruglik, 83 days after sowing and thereafter at intervals of 18, 14, 13 and 13 days, and in the case of Gray Striped, 111 days after sowing and thereafter at intervals of 12 days. The appearance of the heads and seeds was recorded together with the following data at each harvest : length and diameter of stalks, seed yield, humidity, storage capacity, grain content, germination, oil content and oil yield. The greatest stalk length and diameter were reached before flowering. The following were determined when the base of the heads was yellowish and the bracts brown : maximum seed yield, minimum amount of underdeveloped seed, maximum grain content, greatest hectolitre weight, and highest thousand-grain weight. The humidity of the seed was approximately 30 to 45 per cent. Oil content and yield increased constantly as the plant approached full maturity. The best germination and most vigorous seedlings were obtained from harvesting when the base of the heads was yellowish and the bracts still green. The best time to harvest for good seed is when the heads are yellowish and the bracts brown. The seeds at this stage are excessively humid and must be dried before storage. Postponing harvest until the plants are fully mature results in great loss from the shedding of seed.—From author's summary.

Varieties

510 Reestman, A. J. Topinambour. [***Helianthus tuberosus.***] *Versl. Cent. Inst. Landbouwk. Onderzoek* **1948**, 65-7, 1949. [Cent. Inst. Agric. Res., Wageningen, Netherlands]

Results of a trial of five varieties made in five places are tabulated, and the varieties are described. Oude van het Spijk, a variety already known in the Netherlands, and Violet Commun, a French variety, were found to be the most reliable. Cultural and storage problems are discussed, the respective advantages of topinambour and potato growing being compared.—G.M.R.

Seeds

511 Major, F., Matthews, W. S. A., and Smith, G. **Sunflower seeds from Nigeria and the Gold Coast.** *Bull. imp. Inst., Lond.* 1948, **46**, 197-209.

Physical and chemical analyses are reported of samples of sunflower seeds of six varieties grown at Samaru, Nigeria, and at Mampong, Gold Coast. The Nigerian samples contained satisfactory percentages of oil. All samples from the Gold Coast produced oils with somewhat abnormal constants, and three had rather low oil percentages.—G.K.G.C.

LINSEED

Varieties

512 Bagge, H. Forsøg med sorter of oliehør 1940-1947. [**Trials with varieties of oil flax 1940-1947.**] *Tidsskr. Planteavl* 1950, **53**, 259-69.

Since 1940 Danish and Swedish plant breeders have been engaged in improving oil flax, many new varieties being produced. From 1944 to 1947 at the Danish Experimental Stations at Lyngby, Aarslev and Borris, trials were carried out with some of these and also with an imported Argentine variety. The data reported relate to seed yield, seed quality, yield of crude fat, straw length, tendency to lodge, date of flowering and date of harvesting (which, as a rule, corresponds fairly closely with date of ripening).—R.P.J.

513 Marciotte, C. V. Siembra del lino. Variedades adecuadas. [***Linum usitatissimum,* suitable varieties.**] *Almanaque Min. Agric. Argentina* 1949, **24**, 367-8. [Asst. Linseed Section, Directorate of Exp. Stations, Argentina]

The subject is treated in relation to the fungus-produced wilt which is the most serious hindrance to successful linseed growing in Argentina, and to the endemic disease known as *pasmo*, which becomes accentuated in moist, hot weather. Varieties recommended are: Charrua M. A., a strain bred by the Pergamino Experiment Station, which is resistant to wilt and immune to rust but susceptible to *pasmo*; Querandi M. A., resistant to wilt but not to *pasmo*; and Klein II, practically resistant to *pasmo* but very susceptible to wilt. The first two are suitable for soils already more or less exhausted after successive linseed growing, the last-named for lands new or free of wilt.—G.M.R.

514 Friederich, J. C. Olievlas. [**Oil flax.**] *Versl. Cent. Inst. Landbouwk. Onderzoek* **1948**, 70, 1949. [Cent. Inst. Agric. Res., Wageningen, Netherlands]

Twenty trials were conducted in different parts of the Netherlands in 1948 with encouraging results to test ten linseed varieties from Argentina, Canada, Denmark, Sweden and the U.S.A. The experiments were to be amplified in 1949. With a distance of 20 cm. between rows and a seed rate of approximately 80 kg. per hectare the Danish variety Daehnfeldt's Elite 369 gave a mean seed yield of 2000 kg. per hectare, and had an oil content of 43.7 per cent of the dry matter and an iodine number of 197.5. The varieties next in order of promise were Canadian Royal, on account of its high seed yield, and American Redwing, on account of its earliness. Selection of some types for breeding is in progress. The Egyptian variety Baladi, valuable for its unusually early character, is being crossed with Daehnfeldt, Victory and Arrow.—G.M.R.

GROUNDNUT

Agronomy

515 De Pretis, E. Il piano inglese delle arachidi riveduto e ridotto. [**The British Groundnut Scheme revised and modified.**] *Riv. Agric. Subtrop. e trop.* 1949, **43**, 183-7. [English summary, 187]

516 Paiella, A. L'arachide. [**Groundnut.**] *Agric. nuova* 1949, **1**, 11-7.

Cultural requirements and the world situation of this crop are discussed. *Arachis* was imported into Italy at the beginning of last century and its cultivation slowly extended in a few zones (particularly in the South) where climate and soil are more favourable. In 1948 the area under this crop was 3,868 ha., the Campania region occupying first place. Here cultivation is in the normal rotation and allows a second crop to be grown; spring sowing gives better results than summer sowing. In Calabria cultivation with irrigation is under trial. Although groundnut cultivation is justified in Italy by the high value of the product, conditions do not permit great development.—E.B.

Varieties

517 NIEVES, R. Primeros resultados de las campañas de fomento del cultivo del Maní Blanco, realizadas en la provincia de Córdoba. [**Preliminary results of efforts to popularize the growing of the groundnut variety Maní Blanco in the Province of Córdoba.**] *Bol. Prod. Fom. agric.* 1949, **1**, No. 6, 23-7. [Head Oil Plants Div., Directorate Spec. Crops, Min. Agric. Argentina]

The yield and chemical composition of Maní Blanco (white groundnut) and Maní Colorado (coloured groundnut) grown in thirty different localities are tabulated and compared. The superiority of the white is demonstrated by: (1) better yield, the mean absolute difference being 410 kg. per hectare, the mean relative difference 30 per cent; (2) better yield of kernel in the cleaned groundnut, the percentage being 74.18 in the white and 72.96 in the coloured; (3) higher percentage of sound nuts; (4) higher percentage of oil in the dry matter, the mean difference in favour of the white being 2.83 per cent. Other advantages of the white are that it gives a better yield of straw for forage, the straw being of superior quality, and that it is more resistant to pests, plant parasites, and drought. The importance of these findings for the Province of Córdoba, which produces 85 per cent of Argentina's groundnut crop, is stressed.—G.M.R.

Diseases and Pests

518 CICCARONE, A. Marciume dei frutti di arachide dovuto a *Thielaviopsis basicola* (Berk.) Ferr. [**Rot of groundnut pods caused by *Thielaviopsis basicola* (Berk.) Ferr.**] *Ital. agric.* 1949, **86**, 741-3, bibl. 12.

This disease is reported from Calabria where it has seriously damaged the pods, which are attacked shortly before harvest. Control was obtained by reducing the number of irrigations and by advancing the harvest by 20 days.—E.B.

FIBRE CROPS

GENERAL

Technology

519 ERCILLA, C. A. L. Bromeliaceas indígenas textiles. [**Indigenous fibre plants of the family Bromeliaceae.**] *Almanaque Min. Agric. Argentina* 1949, **24**, 275-87. [Agronomist, Directorate for Special Crops, Min. Agric. Argentina]

This article is concerned chiefly with economic and mechanical aspects of processing the following plants, which grow wild in Argentina and are commonly used for fibre: *Pseudananas macrodontes*, *Bromelia hieronymi*, *B. balansae*, *B. serra*, *B. laciniosa*, *Deinacanthon urbanianum*, *Dyckia chaguar*, *Aechmea distichantha*.—G.M.R.

520 SPOON, W. Ramie. [***Boehmeria nivea*.**] *Landbouwk. Tidjdschr.* 1950, **62**, 40-5, bibl. in text. [English summary, 45.] [Trop. Products Division, Ind. Inst., Amsterdam]

There is a renewed interest in the growing of ramie in Indonesia and Surinam (Dutch Guiana). During the Japanese occupation planting was encouraged in Java and Sumatra because of the scarcity of cotton, and samples of the resulting crops are described and discussed in relation to the quality of the processed product.—G.M.R.

521 MIRANDA, F. Observaciones botánicas en la región de Tuxtepec, Oax., con notas sobre plantas útiles. [**Botanical observations in the region of Tuxtepec, Oaxaca, Mexico, with notes on useful plants.**] *An. Inst. Biol. Mex.* 1948, **19**, 105-36. [Inst. Biol., Univ. Mexico]

Among the natural resources listed are the fibre plants *Bixa orellana*, *Heliocarpus donnell-smithii* and *Ceiba pentandra*, all abundant; *Belotia campbellii* and *Aechmea magdalenae*. The last-named plant yields a superior fibre of exceptional strength and is the basis of a native textile industry. It has no place in international commerce as yet, but its potential importance is considerable.—G.M.R.

FLAX

Agronomy

522 FRIEDERICH, J. C. Vezelvlas. [**Fibre flax.**] *Versl. Cent. Inst. Landbouwk. Onderzoek* 1949, **1948**, 67-70. [Cent. Inst. Agric. Res., Wageningen, Netherlands]

Results of flax variety trials in 1946 and 1947 are summarized (see *Fld Crop Abstr.* 2, Abs. 932). These results were confirmed by those obtained in 1948. Other findings were that, with the normal seeding rate, a distance of 8 cm. between the rows is preferable to 20 cm. An excessively heavy application of nitrogenous fertilizer results in a lower yield of straw and poorer lint quality. A conditioning chamber has been constructed to enable flax samples to be reduced to the same moisture content before swingling, and an oast has been built to study the effect of temperature, time and moisture content on the quality of lint. Selection of types with desirable characters is in progress, and a cross has been made between the standard variety Concurrent and the rust-resistant variety Cascade. In weed control experiments treatment with 0.25 per cent DNOC at the rate of 1000 litres per hectare, the plants being 10 to 15 cm. high, gave good results, confirming those of the previous year. An American product had the same effect when used in twice as strong a concentration, but was more difficult to use and is not recommended for flax cultures. Ten varieties were studied in three different places for resistance to rust and black tip: results are tabulated and the general experience that for most varieties late sowing results in heavier black tip infection was confirmed.—G.M.R.

523 REMUSSI, C. La cosecha de lino textil en la Repúblic Argentina. [**Harvesting fibre flax in the Argentine Republic.**] *Bol. Prod. Fom. agríc.* 1949, **1**, No. 1, 4-10, illus. [Textile Div., Directorate of Special Crops, Min. Agric., Argentina]

Although harvesting flax by hand results in a somewhat better amount of long fibre being obtained than when machinery is used, the cost of labour renders anything but machine harvesting uneconomic. Equipment is discussed with special reference to the Leterme harvester, a Belgian model now made in an improved tractor-drawn form in Argentina, and the Soenens, horse or tractor-drawn, suitable for small cultures. The technique of field drying, arrangement in sheaves and stacking in ricks, is outlined. A yield of 4000 to 5000 kg. straw and seed per hectare should be obtained.—G.M.R.

524 FISHLER, D. W. **Fibre flax in Oregon.** *Econ. Bot.* 1949, **3**, 395-406. [U.S. Dept. Agric.]

Russia, Poland and the Baltic countries account for about 90 per cent of the world's production of fibre flax, and prior to 1940, 90 per cent of the raw fibre used in the United States was imported from Europe. To-day domestic production in the Willamette Valley of Oregon represents a 3 million dollar industry.—Extract.

525 GRAINGER, F. **Flax processing and quality.** *J. Text. Inst. Manchr.* 1949, **40**, P918-34.

Most aspects of flax cultivation and processing are discussed. They include methods of approach to farmers by contract for the growing of flax; ground selection and soil types; cultivation, manures, sowing and seed; brairding and weeds; diseases; pulling, harvesting and transport. A short account is also given of the morphological characters of the plant, crop classification, and field grading. Quality and grading characteristics are listed.—S.D.

Technology

526 GRUGET, E. A. Aprovechamiento industrial de los rastrojos del lino oleaginoso. [**Industrial application of linseed straw.**] *Bol. Prod. Fom. agríc.* 1949, **1**, No. 4, 4-17, No. 5, 4-22, illus. No. 6, 4-22. [Head of Textile Div., Directorate of Special Crops, Min. Agric. Argentina]

Burlap is now manufactured on a large scale from the straw of Argentina's linseed cultures, and twenty factories with a total annual output capacity of 12,000 tons are situated in various parts of the linseed region. The present article is concerned largely with the economic and mechanical aspects of the subject, but there is also a section on the breeding of dual-purpose flax varieties by Boerger at La Estanzuela, Uruguay, by the Pergamino Experiment Station in Argentina, and elsewhere, and a considerable amount of illustrated information on methods of macerating, harvesting and baling the crop. A common practice in Argentina is to allow the plants, after removal of the seed, to rot on the foot in the dew, being subsequently (the exact stage is described) harvested and baled. Alternatively, the straw is cut immediately after the seed harvest and carried to the factory for retting in water.—G.M.R.

527 TURNER, A. J. **The structure of textile fibres. VII—The structure of flax.** *J. Text. Inst. Manchr.* 1949, **40**, P857-68, illus.

The article describes the anatomy, morphology, chemical composition and technology of *Linum usitatissimum*, and the methods of separating the flax fibres from the neighbouring tissues.—S.D.

CANNABIS

Agronomy

528 AGER. Cultivo y preparacion del cañamo. [**Cultivation and preparation of hemp.** (*Cannabis sativa*)] *Ager, Madrid* 1949, **5**, No. 55, 11-3 and 19.

This article gives information on : regions of cultivation, soil, preparatory work, fertilizers, sowing, weeds, harvesting, rotations and the process for obtaining the fibre from the stems.—E.B.

KENAF HEMP

Technology

529 SALAZAR, C. G. Kenaf, una fibra textil suave y su posible adaptación a Puerto Rico. [**Kenaf, a soft textile fibre plant and its possible adaptation to Puerto Rico.**] *Rev. Agric. Puerto Rico* 1949, **40**, 132-5, bibl. 5, illus.

Information on *Hibiscus cannabinus* and how to cultivate it. Its chief use in Puerto Rico would be for the manufacture of sugar bags in place of those imported annually at a cost exceeding 3 million dollars. Trials are in progress at the College of Agriculture, Mayagüez.—G.M.R.

COTTON

Agronomy

530 TOWER, J. A. **Cotton change in Alabama, 1879-1946.** *Econ. Geogr.* 1950, **26**, 6-28, bibl. 30.

531 HUTCHINSON, S. B., and MANNING, H. L. Les cotonniers de Sea-Island. [**Sea Island cottons.**] *Rev. Bot. appl.* 1949, **29**, 162-75.

This is a French translation of an article published in *Emp. J. exp. Agric.* Vol. 13, pp. 80-92, 1945.—E.B.

532 INSTITUTE OF INTER-AMERICAN AFFAIRS, FOOD SUPPLY DIVISION, LIMA, PERU. **Report on cotton** (*Gossypium* **species**) **with special reference to cotton as a crop in Peru.** By *G. E. Nicholson*, 1948, pp.58.

The cotton growing regions of the world and the distribution of principal commercial types are indicated. From the classification of world types on a basis of quality, five main types are recognized, namely : (a) Sea Island ; (b) Egyptian ; (c) American Upland, long staple ; (d) American Upland, short staple ; and (e) Asiatic. Both (a) and (b) are types of *G. barbadense*, the American Upland cottons belong to *G. hirsutum*, while the Asiatic cottons include both *G. herbaceum* and *G. arboreum*. Other recognized commercial types are Marie Galante, Moco and Haiti cotton, all belonging to *G. hirsutum*, and the Peruvian Tangüis cotton which is a *G. barbadense* type. Part one of this report includes the classification of world cottons and the origin and distribution of both wild and cultivated cottons. The problems involved in world classification are extremely complicated and the full classification distinguishes many different types which belong to the 26 and the 13 chromosome groups. In the origin and distribution studies the genetical aspect is stressed, and the distribution of cultivated Old and New World cottons is traced.

The *G. barbadense* group (particularly the Peruvian cottons) is considered. The habit, growth and morphological characters of the Peruvian indigenous cottons, *G. raimondii* and "Pais" cotton (*G. barbadense*) and of the Tangüis perennial or semi-perennial cotton are each described. The last section deals with the cotton-growing areas in Peru and their distribution, the history of cotton production in that country, and the contemporary situation. The climatic features of the cotton-growing coastal zone are examined and details are given concerning the principal rivers and their irrigation schemes. The total acreage and production of Peruvian cotton is discussed in relation to foreign markets and some of the social and financial factors of cotton, sugar cane and rice production are described. The objectives are listed for the improvement of the Tangüis and Pima types of cotton, and the necessary improvements in cultivation methods and in control of insect pests are also described. In conclusion, a more balanced system of farming is recommended. The cultivation of annual cottons and wilt resistant hybrids would permit the practice of rotations and the growth of more food crops in Peruvian agriculture.—M.E.E.

533 WINDEL, D. **Developments in the world raw cotton situation during the 1948-49 situation.** *Emp. Cott. Grow. Rev.* 1949, **26**, 196-202

In view of the increased acreages grown in U.S.A., South America, the African continent, India and Turkey, world production did not exceed the 1947-48 output as much as was anticipated since the good harvest in U.S.A. was offset by one smaller than expected in India, Pakistan and Russia. On the other hand, world consumption fell below expectation due mainly to the sharp curtailment of mill operations in U.S.A. A further increase in acreage is anticiapted in 1949-50 in U.S.A., Mexico, Egypt, India and Pakistan ; in parts of Africa and in South America the acreage is expected to equal that of 1948-49.—A.D.H.

534 Mahta, D. N. **Indian cotton position—past and present.** *Emp. Cott. Grow. Rev.* 1949, **26**, 175-85.

While cotton has long been grown in India, breeding for improvement was little understood in the early days. Attention was chiefly upon the cultural side. With the setting up of the Indian Central Cotton Committee in 1921, there was rapid improvement in quality, and the evolution, development and spread of improved varieties went ahead. Yield was also raised, but compared with yields in Egypt, U.S.A., and the U.S.S.R., it was very low. The bulk of the cotton grown is of the medium or short staple varieties because in India the crop must be grown under rain-fed conditions. The greater part of the long staple variety is grown in Pakistan where there is a large acreage under irrigation. The necessity for increasing food production at the expense of cotton during the last war reduced somewhat the unbalance in production between the short, medium and long staple varieties of cotton, but partition has emphasized the shortage of long staple cotton in the Dominion of India.—A.D.H.

535 Rainey, R. C. **Cotton in Ethiopia and the Somalilands.** *Emp. Cott. Grow. Rev.* 1949, **26**, 186-95.

These countries may be of potential interest as a modest source of long-staple cotton outside the Nile Valley. Two of the four wild lintless species of *Gossypium* are found in the Somalilands, and cotton has long been cultivated in the Quolla and the lower parts of the Woina-Dega. During the Italian occupation, cultivation of cotton was encouraged. Description is given of the characteristic vegetation, water supply and climate of: the Awash Valley, the area round Lake Margherita, the Rift Valley, the plain of Kobbo, the Nakamti district and the Upper Sobat basin. These descriptions outline the actual and potential possibilities of cotton production in Ethiopia. The chief cotton growing area of Somalia is round the middle Webbe Shibeli and the Upper Juba, but Afgoi, Genale and Juba are also suitable. The yield of 1 to 3 q. lint per hectare compares unfavourably with 4 to 4.5 q. for Egypt and the Sudan.—A.D.H.

536 Afzal, M. **The cotton crop of Pakistan.** *Emp. Cott. Grow. Rev.* 1949, **26**, 122-8. [Cott. Botanist, Lyallpur, Pakistan]

Most of the Pakistan cotton crop (⅞ to 1 in. staple) is grown in the Western Zone. At one time it was almost all exported to Indian mills. Recently it entered the international market and now forms about 6 per cent of the world total. The most important varieties and their fibre characteristics are described according to the States in which they are grown. The largest acreage is in the West Punjab followed by that of Sind. The total acreage has declined a little in recent years, but production totals have been maintained owing to steadily increasing yields per acre which, in the West Punjab, have attained 237 lb. of lint per acre in certain years. Irrigation plays a large part in cotton production in Pakistan and recent trends have been towards longer staple length and higher spinning counts.—M.E.E.

537 United States, Department of Agriculture. Tech. Bull. No. 979. **Influence of fertilizers on growth rates, fruiting habits, and fiber characters of cotton.** By *Dalton R. Hooton* et al., 1949, pp.31. [Bur. Plant Ind., U.S. Dept. Agric.]

A strain of Acala cotton was grown on Hunt clay, at Greenville, Texas, for 5 successive years, both with and without fertilizers. Studies were made of the influence of fertilizers on growth rates and fruiting habits and on certain fibre characteristics. The fertilizers were applied at the rate of 600 lb. per acre and in five different ratios of NPK, namely, 0-15-0, 3-9-3, 9-3-3, 0-0-15, and 15-0-0. Under experimental conditions the 0-15-0 and 0-0-15 fertilizers had little influence on the growth rates and fruiting habits, whereas the N-bearing fertilizers were generally effective. Nitrogen influenced both early and late growth rates of the main stalk, the growth rate of fruiting branches, the number of flowers per plant, the distribution of flowers in the 2nd to 6th week of the flowering period, the number of bolls per plant, and the yield of seed cotton. Nitrogen did not influence the stage of development at the time of initiation of fruiting, the length of the boll-shed period, the percentage of flowers developing into mature bolls, or the length of the boll-maturation period. The greatest effects of the fertilizer combinations on the fibre properties were observed in an increase of fibre length with high phosphate and high potash fertilizers and a decrease in length with combinations containing nitrogen. The growth rates and fruiting were influenced by seasonal changes, as were also some of the fibre properties.—From authors' summary.

538 Anandan, M. **'Note' on the trial of Cambodia cotton at the Agricultural Research Station, Aduturai, Tanjore delta.** *Indian Cott. Grow. Rev.* 1948, **2**, 199-207. [Dept. of Agric., Madras]

Varieties

539 Bancroft, T. A., and Smith, A. L. **Efficiency of the simple lattice design relative to randomized complete blocks design in cotton variety and strain testing.** *Agron. J.* 1949, **41**, 157-9, bibl. in text.

The experiments were conducted in Alabama and Georgia during the years 1943-47 inclusive. An investigation of plot, incomplete block, and replication size and shape revealed that there is little advantage in one design over the other for all of the experiments taken together.—From authors' summary.

540 Harland, S. C. **Methods and results of selection experiments with Peruvian Tanguis cotton. Part I. A survey of present methods of cotton breeding and a description of the "Mass pedigree system."** *Emp. Cott. Grow. Rev.* 1949, **26**, 163-74.

Though in 1933 Tanguis cotton made up 91 per cent (as compared with 8 per cent in 1918) of the Peruvian cotton crop, complaints of degeneration in quality were recorded, and resulted in an investigation to improve and restore the strain. An account of the origin, characteristics and results of the first 3 years' work, published in 1944 by Harland, is summarized.—A.D.H.

541 Nayak, H. R. **Studies in the quality of *hirsutum* cottons grown under irrigation on the Arbharvi farm.** *Indian Cott. Grow. Rev.* 1948, **25**, 178-86. [Cotton Res. Lab., Dharwar]

Four varieties of *Gossypium hirsutum* were tested during four seasons to determine the most suitable for growing in the Belgaum District of Bombay Province under canal irrigation. Characteristics of fibre length and weight, maturity coefficient, ginning percentage, lint index and yield per acre were studied for each variety. The variety Co. 4 proved superior to the others.—M.E.E.

Seeds

542 Afzal, M. **Cotton seed, oil and cake.** *Indian Cott. Grow. Rev.* 1948, **2**, 167-77. [Cotton Res. Lab., Lyallpur]

Only in the last 200 years has cotton seed been used as a source of oil. An historical sketch is given of this development in U.S.A. and India. Three categories of cotton seed are distinguished: the *desi* type, with very short fuzz; the partly naked seed of some American varieties, grown mainly in Western Pakistan; and the full fuzzy American cotton seed. World production figures are given with data for different countries. The chemical analyses of cotton seed and cotton seed cake are tabulated. The feeding value of the seed varies according to variety, the fuzzy American type being the most suitable. The oil content of many Indian cottons ranges from under 15 to 22.5 per cent.—M.E.E.

Technology

543 Heiba, A. S. **Modified methods for staining the primordial cells of *Gossypium* hairs.** *Stain Tech.* 1950, **25**, 39-40.

544 Balls, W. L. **An air-test for moisture in cotton.** *J. Text. Ind. Manchr.* 1949, **40**, T759-66.

The air-test consisted in withdrawing air from the cotton sample (actually with recirculation) and measuring its humidity, this being first expressed as milligrammes of water per litre of air, and then converted to relative humidity at the temperature of the cotton sample. From the result of subsequent oven tests graphs were obtained showing the relation between moisture content of the cotton and the relative humidity of the air inside it.—Extract.

545 United States, Department of Agriculture. Leafl. No. 181. **Drying seed cotton.** By *F. L. Gerdes*, *W. J. Martin* and *C. A. Bennett*. 1949. [Revised edn] pp. 8.

Since the institution of the cotton ginning laboratories at Stoneville, Mississippi, in 1926, the investigation of drying and ginning problems has entered a new phase. The use of the vertical drier (construction described) for seed cotton has increased, and by 1948 about 5000 driers were registered.—M.L.Y.

Diseases and Pests

546 Revista de Agricultura de Puerto Rico El algodón y los nuevos insecticidas sintéticos en los Estados Unidos. [**Cotton and the new synthetic insecticides in the United States.**] *Rev. Agric. Puerto Rico* 1949, **40**, 147-52.

An article reprinted from *La vida agricola*, Lima, Peru, gives a general account of American research to date on the use of insecticides in cotton cultures, compares conditions in the United States and Peru, and in discussion enjoins caution in the use of insecticides.—G.M.R.

547 Balasubrahmanyan, R., and Rangaswami, T. V. **Contabescent anthers and hollow seeds in cotton.** *Indian Cott. Grow. Rev.* 1948, **2**, 193-8. [Dept. of Agric., Madras]

Several defective characters noticed in Cambodia cotton grown as an irrigated summer crop at the Research Station at Palur were attributed to changes in contabescence following fluctuations in environmental conditions. Studies were made on the effects of soil correctives such as boron, potash and lime on the contabescence of cotton flowers. Varieties from the species *hirsutum*, *barbadense*, *herbaceum* and *arboreum* were included for study. Results are tabulated and details given of the climatic and soil characteristics of the growing areas. Development of hollow seeds was another defect: and preventive measures are being studied.—M.E.E.

ROSELLE

Agronomy

548 CRANE, J. C. **Roselle—a potentially important plant fiber.** *Econ. Bot.* 1949, **3**, 89-103. [Univ. of Calif.]

Although *Hibiscus sabdariffa* is grown mainly for fruit, its fibre is a satisfactory substitute for jute (*Corchorus capsularis*). History, description and nomenclature of the plant are given and some details of its more recent introduction into the western hemisphere are described. Green, red and intermediate roselle types are distinguished, as well as tall-growing and short-branching varieties. The chief fibre varieties are *altissima* and *bhagalpuriensis*, while *intermedius*, *albus* and *ruber* are used for both fibre and fruit. Experiments in intervarietal crossing are discussed and the plant's photoperiodic, climatic and soil requirements are outlined. Detailed experiments on the plant's cultural requirements have not yet been made, but the use of *Mimosa invisa* as green manure has been recommended. For good fibre production of long, clean, unbranched stems, planting should begin at the start of a 3- or 4-month period characterized by 18 to 20 in. of rain with daylengths of not less than 13 hours. Other factors affecting fibre quality are spacing between plants and rows, and the methods and time of harvesting. Little agreement is found regarding the best method of fibre extraction. Yields vary between 1000 and 2000 lb. of dried fibre per acre. Roselle fibre may be employed for all materials and ropes for which jute is now used.—M.E.E.

MILKWEED

Technology

549 BERKMAN, B. **Milkweed—A war strategic material and a potential industrial crop for sub-marginal lands in the United States.** *Econ. Bot.* 1949, **3**, 223-39.

The paper is concerned with the use of species of *Asclepias*, the commonest and best known being *A. syriaca*. The venture into industrial harvesting, processing and utilization of milk-weed during the second world war established the following facts. The principal products of industrial value to be obtained from milkweed are floss from the seeds, and bast fibre from the stalks, a source of cellulose. By efficient separation of floss from seeds and pod-shells, the seeds constitute a potential source of oil. Wax, to the extent of 5 per cent by weight, can be extracted from the pod-shells as a third by-product of the principal product, floss. Since the main products, floss and fibre, are bulky, the plants must be grown as an agricultural crop, not wild. There are established markets for the floss, fibre and seed if their value in competition with similar products is accepted. If mechanization can be extended to planting, cultivating and harvesting the crop (pods and stalks must be collected separately), a completely mechanized industry will be attained.—From Author's summary.

ABROMA

550 KIRBY, R. H. ***Abroma augusta* fibre from Uganda.** *Bull. imp. Inst., Lond.* 1948, **46**, 192-7.

Notes are given on the cultivation, harvesting and preparation of *Abroma augusta*. Samples of the fibre grown in Uganda were submitted for market report and spinning tests ; the material resembles *Hibiscus cannabinus* rather than jute, with which, however, it may be mixed for certain uses.—G.K.G.C.

OTHER CROPS

BUCKWHEAT

551 SOLITERMAN, P. V. [**Some aspects of warm soaking of buckwheat seeds.**] *Selek. Semenovod.* 1949, No. 2, 75-7. [Russian]

If seeds are soaked (before sowing) in water at 40°C. for 10 min. an indication is given of differences in the sowing qualities : the light, pale-brown seeds from the upper parts of the shoots float while the heavy, dark-brown seeds from the lower parts of the shoots sink. The plants from treated seeds of both classes were similar in seed yield, giving 16.8 and 18.2 per cent more than those from the dry seed control, and over 32 per cent more than those from plants derived from floating seeds soaked before sowing in water at 12 to 15°C. —M.A.O.

CROP BOTANY

PLANT PHYSIOLOGY

552 Erickson, R. O., and Rosen, Gloria U. **Cytological effects of protoanemonin on the root tip of *Zea mays*.** *Amer. J. Bot.* 1949, **36**, 317-22. [Univ. Pennsylvania, Philadelphia]

553 Tsao, Tsung-Hsun. **A study of chemotropism of pollen tubes in vitro.** *Plant Physiol.* 1949, **24**, 494-503, bibl. 21. [Univ. Texas, Austin]

554 Gaetani d'Aragona, G. Ricerche sulle influenze dei campi elettromagnetici e dei raggi X sui tropismi dei vegetali. [**Investigations into the effect of electro-magnetic fields and X-ray on plant tropisms**] *Ann. Sper. agr.* 1949, **3**, n.s. 1081-1100. [English summary, 1099-100] bibl. 12. [Rome, Ist. Frutticolt. e Elettrogenet.]

The author first reviews the recent theories on tropism, particularly the various interpretations of the mechanism of geotropism. He then refers to his trials carried out with various species, including *Helianthus annuus* var. *nana*, *Brassica campestris* var. *rapa*, and *Triticum vulgare* var. *Roma*. The apices of young plants were subjected to the influence of electro-magnetic fields and X-rays. The stems were then placed horizontally and the orthotropic curvature observed (the term orthotropism indicates the combined action of negative geotropism and of light tropism when the source of light is placed above). In comparison with the controls, the treated plants reacted differently. With low frequency electro-magnetic treatment there was an earlier onset and greater angle of curvature; n a high frequency electro-magnetic field and with X-rays the onset of curvature was delayed and the angle smaller.—E.B.

555 Sempio, C., and Shkjezi, A. Metabolismo e recettività in piante afflosciate. [**Metabolism and susceptibility in wilted plants.**] *Ann. Fac. Agr. Univ. Perugia* 1946, **4**, pp. 15.

Wilted plants are more susceptible to parasitic fungi than are normal plants. Trials were carried out with four wheat varieties and one kidney-bean variety to study the influence of wilting (obtained by exposing young plants to the sun for 3 to 4 hours) on respiration and photosynthesis. Reaction differed in the two species. In wheat, there was a strong and lasting increase in respiration and a smaller increase in photosynthesis. In kidney-bean, there was only a small increase in espiration and a great decrease in photosynthesis. It is concluded that increased susceptibility of wheat (particularly to *Erysiphe graminis*) in consequence of wilting is due only to decreased tension of the external tissues; in kidney-bean there is in addition a reduction of the resistance of the plant in consequence of disturbance in the metabolic processes.—E.B.

556 Gäumann, E. Über den Mechanismus des infektiösen Welken. [**The mechanism of pathological wilting.**] *Biol. Zbl.* 1948, **67**, 22-6. [Eidg. Tech. Hochsch., Zürich]

Specific toxins (from fungi, bacteria and viruses) react on the water balance and respiration of infected plants. Water balance alone is considered in this paper. The actual experiments were conducted on tomato using lycomarasmin, the poison form *Fusarium lycopersici*. [The work is noted here because the underlying principle should be of very general application.]

Two entirely different processes of toxic wilting are distinguished. The first, which takes place at low concentrations of toxin, is a loss of water caused by the plasma loosing its power of retaining its " bound " water. There is a loss of water into the transpiration stream of the cell walls and hence excess of transpiration. The second is a pathological wilting. The toxins injure the plasma membrane and vacuole wall in such a way that they lose their semi-permeability. This results in a movement of osmotically active substances from the inside of the cell into the transpiration stream of the cell walls and a consequent disturbance of the state of turgor of the cell. This is the real cause of pathological wilting. It is an irreversible process and can take place even when there is an abundance of water in the cells.—D.B.

557 Franco, C. M., and Costa, A. S. **A simple aerator for nutrient solutions.** *Plant Physiol.* 1949, **24**, 320-2. [Inst. Agronomico, Campinas, Sao Paulo, Brazil]

The apparatus, which is described and illustrated, supplies intermittent air pressure and can be used under almost any condition of hydrostatic pressure. The air pressure obtained is enough for the aeration of plant nutrient solutions and could be used for other types of work which require aeration.—D.B.

558 Bakhuijzen, H. L. van de S., and Wittenrood, H. G. Afdeling Plantkundig Laboratorium. [**Botanical Laboratory.**] *Versl. Cent. Inst. Landbouwk. Onderzoek* 1949, 1948, 107-13, [Cent. Inst. Agric. Res., Wageningen, Netherlands]

An account is given of the following work by the Central Institute's Botanical Laboratory in 1948.

(1) Growth of the wheat variety Carma in pots of sand kept constantly at 60, 45, and 30 per cent of the water capacity by sub-irrigation. The number of leaves and the general development of the plant was greater at 60 per cent than at 45 and 30 per cent. Under preponderantly blue light development was slower and the number of leaves larger than under a preponderance of red light. (2) Sugar beet was exposed to normal and to 18-hour long day at the end of July in order to discover whether the xeromorphic condition of sugar-beet leaves noted after the end of July is a phenomenon governed by length of day. (3) Chilling experiments in 1947-48 to determine the degree of resistance to cold in wheat and rye varieties. Two experiments are described and results obtained are discussed in relation to the normal cold requirements of the varieties and the time at which they are exposed to chilling. (4) Seed production in *Helianthus tuberosus*. This has not been achieved under natural conditions in the Netherlands, and efforts were made to induce it by means of (a) short-day treatment, and (b) grafting on to *Helianthus annuus*, a plant neutral to daylength, but the plants flowered too late for successful seed formation, which was further inhibited by tuber formation.—G.M.R.

559 SEMPIO, C., and SHKJEZI, A. Metabolismo nelle piante carenti. 1. Fotosintesi e respirazione in piantine di frumento K carenti. [**Metabolism in plants with mineral deficiency. 1. Photosynthesis and respiration in young wheat plants deficient in potassium.**] *Ann. Fac. Agr. Univ. Perugia* 1946, **4**, 10

The authors are carrying out research on the metabolism of plants grown in nitrogen-, phosphorus- and potassium-deficient solutions. Two early wheat varieties, "Mentana" and San Giorgio," grown in a nutrient solution deficient in potassium salts were less developed and paler than those grown in a complete solution. Although K deficiency did not appear to influence respiration considerably, it strongly increased photosynthesis (at least during the first 6 or 7 weeks of development) which gave values two or three times above normal. The authors are of the opinion that this altered ratio between the two functions is the cause of the plant disease itself.—E.B.

560 ABOLINA, G. I. [**Growth and structure of grass leaves in relation to mineral nutrition and soil moisture**] *Doklady Akad. Nauk SSSR* 1949, **68**, 173-6. [Russian] [Karagandin Agric. Expt. Sta.]

In a study of two types of spring wheat (Lutescens 62 and Milturum 321) the following facts emerge: (1) xeromorphism in leaf structure is closely associated with leaf position and with water supply; i.e. the higher the position of the leaf and the less the water supply, the greater the number of stomata in unit surface and the less their size; the effects of large doses of N and P are antagonistic, N retarding growth of the lamina and P accelerating it; a one-sided high N supply has a depressing effect on plant growth, which in turn leads to greater xeromorphism in leaf structure; a one-sided high P supply lessens xeromorphism, and this is manifest also with deficient water supply; P not only accelerates the growth of each leaf, but increases the general number of leaves, and thus the general leaf surface of each plant. In spite of a difference in rate of ripening of the varieties, both exhibit conformity regarding character of leaf formation in relation to mineral nutrition and to variation in moisture supply.—M.H.

561 PORTER, H. K., PAL, N., and MARTIN, R. V. **Physiological studies in plant nutrition. XV. Assimilation of carbon by the ear of barley and its relation to the accumulation of dry matter in the grain.** *Ann. Bot., Lond.* 1950, **14**, 55-68, bibl. 12. [Imp. Coll. Sci. Tech., Lond.]

A continuous record has been made of CO_2 assimilation by day and respiration by night of barley (var. Spratt Archer) ears attached to the plant, and kept under normal outdoor conditions. Assimilation proceeded for 33 days, during which 622 mg. of CO_2 per ear of average grain weight 1.09 grm. were absorbed during 496 daylight hours and 117 mgrm. of CO_2 were emitted during 296 dark hours. Calculated in terms of hexose the net gain of carbon by autonomous assimilation was equivalent to 34 per cent of the grain dry weight or 52 per cent of the starch, a result in accordance with the estimates obtained in earlier experiments with shaded ears. On the assumption that sugars present in the ear at emergence or translocated to it during subsequent growth provide the substrate for respiration, the sum of CO_2 absorbed and the CO_2 formed by respiration in the day, as estimated on darkened ears, could account for 70 per cent of the dry weight of the grain and all the starch.

About 30 per cent of the grain consists of non-starch material, which might arise from the autonomous assimilate rather than starch. The fate of the CO_2 absorbed by the ear is discussed, and also the sources of the material required for its growth in addition to that supplied by its own assimilation.—Authors' summary.

562 MACDOWALL, F. D. H. **The effects of some inhibitors of photosynthesis upon the photochemical reduction of a dye by isolated chloroplasts.** *Plant Physiol.* 1949, **24**, 462-78, bibl. 23. [Carnegie Inst. Washington, Stanford, Calif.]

563 Walter, H. Der Assimilathaushalt unserer Kulturpflanzen unter feldmässigen Bedingungen. [**The assimilation economy of crops under field conditions.**] *Biol. Zbl.* 1948, **67**, 89-94. [Landw. Hochsch., Hohenheim]

Experiments were conducted on wheat, barley, oats, maize, poppy, sunflower and sugar beet; results are given for the first three of these crops. Increase in leaf surface and increase in dry weight of leaves were determined and from these the assimilation per unit area of leaf surface was calculated. There was first an increase in leaf surface and the bulk of the dry matter accumulated in the 2 or 3 weeks before maturity.—D.B.

564 Prill, E. A., Barton, Lela V., and Solt, Marie L. **Effects of some organic acids on the growth of wheat roots in solutions.** *Contr. Boyce Thompson Inst.* 1949, **15**, 429-34.

A number of organic acids (neutralized) of various ypes and a few related compounds have been tested at a series of low concentrations (expressed in erms of millimolarity) for their effects on the growth of wheat roots in a solution of nutrient salts.—From authors' summary.

565 Milthorpe, F. L. **Changes in the drought resistance of wheat seedlings during germination.** *Ann. Bot., Lond.* 1950, **14**, 79-89, bibl. 6. [Imp. Coll. Sci. Tech. London]

Seedlings of two varieties, one reputedly resistant nd the other susceptible to drought, were desicated to varying degrees at different ages, and heir growth response on recovery studied. No varietal difference was recorded; both were highly esistant to drying and showed three distinct ageperiods of varying reaction.

All germination stages from the dormant embryo until the coleoptile reached a length of 3 to 4 mm. were completely resistant to drought, as hown by elongation of severely dried plants proceeding on recovery at a rate comparable with ndroughted plants. Until the emergence of the rst leaf, plants were not permanently injured by a oss of 98 per cent of the total moisture, although longating roots were killed. At later stages less water was required to be lost before expanded issue was killed and the growth rate was permanently reduced by a small loss of water.

These phases of differential drought resistance ppeared to be related to the proportion of meritematic to elongated cells, the former apparently eing completely resistant. The persistence of oot primordia during the early growth stages would thus appear to be an important factor in the rought resistance of Graminaceous seedlings.

Some aspects of the behaviour of tissues during esiccation and recovery are discussed.—Author's ummary.

566 Crook, E. M., and Holden, M. **Some factors affecting the extraction of nitrogenous materials from leaves of various species.** *Biochem. J.* 1948, **43**, 181-5. [Rothamsted Expt. Sta., Harpenden, Herts]

The extraction varied from 41.5 to 93.5 per cent of the total leaf nitrogen, the average for all species being 75 per cent. The extraction was mainly influenced by the N content of the leaves, (increasing with increasing N content) and also by the dry-matter content, as the wetter leaves have a higher nitrogen content.—From authors' summary.

567 Coppenet, M. Dosage du manganèse dans les végétaux. [**Estimations of manganese in plants.**] *Ann. Agron., Paris* 1949, **19**, 798-800.

Procedures which have given satisfactory results are described for plant organs rich in ash or in silica such as wheat straw, and for those with a low mineral content such as wheat grain and potato tuber.—D.B.

568 Chandraratna, M. F. **The effect of day length on heading time in rice** [in Ceylon]. *Trop. Agriculturist* 1948, **104**, 130-40.

Photoperiodic responses previously known in rice varieties native to higher latitudes have been demonstrated in 6-months varieties native to Ceylon (5° 55′ to 9°-50′ N. lat.). The six-months pure lines *Kohumawi*—B. 11 and *Kurulutuduwi* B. 13 were investigated. Monthly plantings showed that a difference in daylength of 49 minutes effected changes in age of over 7 months; those sown in late December to early February, and exposed to the longest days failed to flower in 12 months, while those sown between September and November, and having the benefit of the shortest days, headed normally in 5 months. 3 and 4 month varieties were period-fixed. The effects of photoperiod, duration of induction, and seedling age on heading time of B. 11 and B. 13 sown in season were investigated. By exposure to 9- and 6-hour photoperiods the sowing-to-heading interval was reduced from 20 to 9 or 11 weeks. The 9-hour photoperiod effected greater earliness than the 6-hour period. An induction duration of 2 weeks produced photoperiodic after-effects in plants initially 3 weeks old. 1-week-old seedlings did not exhibit the onset of the photophase. "The effect of duration of induction was investigated in the pure lines B. 11 and B. 13 sown out of season. Control plants failed to flower after 12 months. Exposure for 38 days to a 9-hour photoperiod induced flowering in 75 days. The effect of the photoperiod did not appear to be confined to the initiation of flowering primordia."—M.C.H.

569 Fuller, H. J. Algunas observaciones sobre la fisiologia del florecimiento. [**Some observations on the physiology of flowering.**] *Rev. Agric. Cochabamba* 1948, **5**, No. 4, 3-7. [Prof. Bot. Univ. Illinois, U.S.A.]

Text of a lecture delivered to the School of Agronomy, University of Cochabamba, in 1947. A brief résumé is presented of research on the action of hormones in promoting flowering and fruiting in plants. The practical applications of the findings are indicated.—G.M.R.

570 Mer, C. L., and Richards, F. J. **Carbon dioxide and the extension growth of etiolated oat seedlings.** *Nature, Lond.* 1950, **165**, 179-80. [Res. Inst. Pl. Physiol., Imp. Coll. Sci. Tech., London, S.W.7.]

When etiolated oat seedlings are illuminated there is stimulation of extension growth of the mesocotyl and depression of coleoptile growth.—M.H.

571 Schwabe, W. W., and Thornley, M. J. **Vernalization of winter rye by ultrasonics.** *Ann. appl. Biol.* 1950, **37**, 19-22. [Imp. Coll. Sci. Tech., London]

Petkus winter rye seed was subjected to ultrasonic vibrations of 1 mcyc./sec. frequency in order to test the possibility of their having a vernalizing action. Seed which had not been soaked, fully imbibed seed, germinating seed (radicle showing) and seedlings with about 2 mm. long coleoptiles were treated with two intensities of ultrasonics for two periods of exposure. There was a slight favourable effect on germination rate of the unsoaked seed, but injury or death was caused by higher doses applied to the imbibed or germinated seed. Time of flowering was not affected by this treatment and no vernalization resulted.—Authors' summary.

572 Alpatov, V. V. [**Increase in seed germination under the effect of high temperature and ultra-violet rays.**] *Priroda, Moskva*, 1949, No. 12, 41-3. [Russian].

In earlier tests it has been indicated that although heat and ultra-violet rays can injure protoplasm, a stimulating effect is produced on cell division when these agents are applied in small doses. The author's work in 1942 on germination of carrot and wheat seed support this, and attention is drawn to the need for wider study of the subject. —M.H.

573 Oleĭnikova, T. V. [**Effect of night temperature on rate of development of long-day cereals**] *Doklady Akad. Nauk SSSR* 1949, **68**, 605-8, bibl. 4. [Russian] [All-Union Inst. Pl. Ind.]

While some investigators have demonstrated that in short-day grasses the temperature prevailing during darkness has great influence on plant development, there has been no similar clear evidence regarding long-day grasses. The author has studied this problem with the following varieties: late spring wheat, Milturum 321 with a long light stage; southern spring wheat from India, Pusa 13, with a short light stage; winter wheat Ukrainka (already vernalized at +2°C. for 53 days); the northern oat, Golden Rain, from Sweden; a southern oat from Palestine; and a barley from Abyssinia (a specimen from the mountains where there is a sharp daily change in temperature rhythm). Results show that increased night temperatures retard development, and there is most rapid development if plants are first grown under night temperatures between +6° and +10°C.—M.H.

574 Parker, M. W., and Borthwick, H. A. **Growth and composition of biloxi soybean grown in a controlled environment with radiation from different carbon arc sources.** *Plant Physiol.* 1949, **24**, 345-58, bibl. 10. [Plant Ind. Sta., Beltsville, Md]

The growth in length, weight increase and composition (nitrogen and carbohydrate fractions) of soybean plants produced in controlled environment rooms with a carbon arc lamp as the principal source of radiation have been determined. The arc lamp was used alone with several types of carbons, or was supplemented with a small amount of incandescent radiation. The merits of carbon-arc as a source of radiant energy for plant growth are discussed and compared with other artificial sources. The conclusion is reached that radiation from a carbon-arc supplemented with that from incandescent filament lamps is superior to any other type for growing many kinds of plants.—Adapted from authors' summary.

575 Galston, A. W. **Transmission of the floral stimulus in soybean.** *Bot. Gaz.* 1949, **110**, 494-501, bibl. 31. [Calif. Inst. Technology, Pasadena]

If Biloxi, Peking, Agate, and Batorawka soybeans are grown under a 17-hour photoperiod, the former two will remain vegetative, whereas the latter two will initiate floral primordia. If single Agate or Batorawka leaves are grafted on to Peking or Biloxi receptors previously maintained vegetative by a 17-hour photoperiod, the receptors will be induced to flower. The floral stimulus is incapable of passing from donor leaf to receptor petiole if the donor petiole is scalded. The floral stimulus is incapable of traversing a 1-mm. water gap between donor leaf and receptor petiole.—Author's summary.

576 Stiles, Isabel. **Relation of water to the germination of bean seeds.** *Plant Physiol.* 1949, **24**, 540-45. [Harris Teachers College, St. Louis 12, Missouri]

Graphs present the absorption of water during early stages of germination by the embryo, cotyledon, and seed coat, and by the whole seed of several species of *Phaseolus* and of *Glycine max.* Absorption by the embryo far exceeds absorption by other parts of the seed. The results indicate "that various bean seeds differ in the total amount of water absorbed and in the rates of absorption; that different organs of the seed play one or more roles in the germination process; that seeds apparently possess slight degrees of adaptation to germination in mesic, hydric, and xeric conditions; and that varietal differences appear in the water absorbing capacity of seeds of the several varieties of beans tested." See also *Fld Crop Abstr.* 2, Abs. 73.—d.b.

577 Condon, M. L., Lambou, M. G., Vignes, J. L., Loe, J. B., and Altschul, A. M. **Inhibitors of heating and deterioration in seeds. I. Ethylene chlorhydrin and related compounds.** *Plant Physiol.* 1949, **24**, 241-54, bibl. 8. [Southern Reg. Res. Lab., New Orleans, Louisiana]

The effect of concentration of ethylene chlorhydrin used in treatment of moist flaxseed and cottonseed upon the biological activity in these seeds was nvestigated, and it was found that concentrations bove 0.19 per cent on the basis of the dry weight f the seed inhibited the formation of free fatty cids while lower concentrations stimulated their ormation. All concentrations of ethylene chlorhydrin inhibited heating in seeds to some extent. s the concentration of an inhibitor used in treatng the seed was reduced, the resulting diminution f ability to inhibit heating and formation of free atty acids did not necessarily parallel each other. number of compounds related in structure to thylene chlorhydrin were investigated; propylene chlorhydrin and ethylene bromhydrin had omparable inhibitory activities.—From authors' ummary.

78 Hagan, R. M. **Autonomic diurnal cycles in the water relations of nonexuding detopped root sytems.** *Plant Physiol.* 1949, **24**, 441-53. [Div. Irrigation, Univ. Calif., Davis]

The reverse flow of water through a cut stump into he root system is termed "negative exudation". n order to demonstrate this phenomenon wilted *Helianthus annuus* plants growing in a controlled nvironment (with roots in soil) were detopped hile under water and immediately connected to a eries of pipettes which permitted measurement of ater movement into the stump. The apparatus illustrated. The results are expressed in a series of ten graphs. At first, water intake by the cut stumps (negative exudation) proceeded at a high rate, but rapidly decreased, and in the course of a few days approached zero. Negative exudation, like positive exudation, showed a marked diurnal cycle with the maximum at midnight and minimum at noon. The diurnal cycles, which were autonomic, continued for about 6 days, their amplitude decreasing with time. The cycles are dependent on continued aeration and promptly cease when the atmosphere of air surrounding the roots is replaced by nitrogen or carbon dioxide. Since the cycle was observed in roots washed free of soil it is assumed that the cause of the diurnal cycle lies within the root itself and is not dependent on a periodic transfer of water between root and soil. An interesting discussion centres round former papers (fifteen in number) on exudation and intake of water.—d.b.

579 Rossman, E. C. **Freezing injury of maize seed.** *Plant Physiol.* 1949, **24**, 629-56, bibl. 10. [Michigan State College, East Lansing]

The effects on seed viability and vigour of low temperature, moisture content of seed, variety of seed, physiological maturity, length of freezing period, rate of freezing and thawing, and rate of drying were studied. The results do not explain the exact mechanism of freezing injury but the observations on seedlings suggest intracellular and intercellular ice formation with desiccation and irreversible coagulation of protoplasm. There was no significant difference between yields from frozen and unfrozen seed when approximately equal stands were obtained.—d.b.

580 Ta-chu Lui. **Cultivation of excised shoot tips of *Zea mays.*** *Bot. Bull. Acad. Sinica* 1949, **3**, 12-15.

The tips were cultured in White's solution under aseptic conditions and roots were produced on the node, in light or in darkness, at 20 to 24°C., but not at 34 to 35°C. The higher temperature tends to inhibit root formation.—From author's summary.

581 Rao, K. S., Rao, M. B., and Rao, B. S. **Drought resistance of plants in relation to hysteresis in sorption. I. Hydration and dehydration of the leaves of certain drought resistant and drought sensitive plants.** *Proc. Nat. Inst. Sci. India* 1949, **15**, 41-9. [Central Coll., Bangalore, S. India (K.S.R. and M.B.R.) and Indian Inst. of Sci. (B.S.R.)]

The following plants were studied: balsam grass (species not mentioned), paddy, ragi [*Eleusine*], wheat and oats. Over a relative humidity range of 0.5 to 0.95, balsam takes the lowest and oats the highest amount of water at any particular humidity. The cavity theory is discussed in relation to the hysteresis in sorption and results suggest a definite correlation between the drought-resisting property and the capillary structure of the leaves. —M.E.E.

582 Rao, K. S., Rao, M. B., and Rao, B. S. **Drought resistance of plants in relation to hysteresis in sorption. II. Adaptability of the ragi [*Eleusine*] plant to varying conditions of soil drought.** *Proc. Nat. Inst. Sci. India* 1949, **15**, 51-8. [Central Coll., Bangalore]

Eleusine coracana was grown in soils showing different degrees of dryness the leaves being subjected to a series of hydration-dehydration cycles at 30°C. The cavities and open pores in leaves of the plants grown at different moisture levels were nearly the same in size. Results indicated a correlation between the age of the plant and its water content as determined by leaf dehydration. —M.E.E.

583 McGonagle, M. P. **The effect of certain factors on the formation of root nodules on pea plants in aseptic culture.** *Proc. roy. Soc. Edinburgh* 1949, **63**, Part 3 (No. 15) Sect. B. 219-29.

Considerable numbers of nodules developed on completely etiolated plants of pea grown aseptically on a rooting medium of agar with nutrient salts. The nodules observed on such plants grown continuously in complete darkness were, however, much inferior in number and size to those formed on plants grown in light under otherwise comparable conditions. Nevertheless, the extent of nodulation was considerably superior to that reported by the majority of previous investigators for various leguminous plants, including pea. Thus apparently the etiolated pea can supply the materials required for the formation of a limited number of nodules, although it is kept in darkness during its germination and growth. Sucrose in the rooting medium decreased the number of nodules formed on pea plants grown in continuous darkness, and also on those grown under normal conditions, but nodule size and dry weight were increased; the dry weight of the plants was also increased. The sucrose in some way restricted the invasion of the plant by the nodule bacteria or reduced the number of nodules initiated, but its presence proved beneficial to the development of nodules initiated. The presence of combined nitrogen in the rooting medium reduced the number of nodules formed on etiolated pea plants. When sucrose and combined nitrogen were present together, there was still further reduction in nodule numbers. The addition of aneurin and nicotinic acid to the rooting medium had no significant effect upon the number of nodules formed on etiolated peas. Nodules formed on etiolated pea plants grown on media with and without sucrose had the normal pink colour associated with the presence of haemoglobin. Apparently a limited formation of this pigment is possible in plants grown in the absence of light.—From author's summary.

BIOCHEMISTRY

584 Tordai, L. **Biochemical and industrial uses of radio-tracers.** *Atomics* 1949, **1**, 69-76. [Londonderry Laboratories for Radiochemistry, Univ. Durham]

The article includes a short account of the use of labelled ammonium phosphate for determining the uptake of phosphate fertilizers by the wheat plant. —G.M.R.

585 Atomics. **Radiation and life (2).** *Atomics* 1949, **1**, 108-15.

Extracts from the Sixth Semi-Annual Report of the U.S. Atomics Energy Commission are presented. They deal with biological and medical aspects of atomic energy, and include short accounts of the effects of atomic radiation on the genetics of maize and the use of radiation for accelerating hybridization.—G.M.R.

586 Arnon, D. I., and Whatley, F. R. **Is chloride a coenzyme of photosynthesis?** *Science* 1949, **160**, 554. [Div. Plant Nutr., Univ. Calif., Berkeley]

The theory that chloride is a coenzyme of photosynthesis would endow chlorine with the status of an essential element for growth of higher plants. It would also be the first instance in the history of plant nutrition where the essentiality of an inorganic element has been established by the discovery of its biochemical function, in the absence of corroborative evidence from growth experiments according to specific criteria of indispensability. The authors' results, which refute the role of chloride as a coenzyme in photosynthesis, illustrate the contribution which growth experiments can make in evaluation of biochemical data bearing on the essential status of an inorganic element in nutrition of higher plants.—Adapted extract.

587 Sreenivasan, A., and Wandrekar, S. D. **Oxidation of ascorbic acid by plant extracts.** *Nature, Lond.* 1950, **165**, 318-9. [Dept. Chem. Tech., Univ. Bombay]

The experiments (made in the course of investigations of the biogenesis of vitamin C in plants) with extracts from *Phaseolus radiatus*, *Ph. aconitifolius*, *Lens esculenta* and *Pisum arvense*, are to be recorded in detail elsewhere.—M.H.

588 Hutt, H. H., Malkin, T., Poole, A. G., and Watt, P. R. **Structure of kephalin: presence of serine and a disaccharide in groundnut kephalin.** *Nature, Lond.* 1950, **165**, 314-5. [Messrs. J. Bibby and Sons, Ltd., Liverpool]

589 Blagoveščenskiĭ, A. V., and Čikalo, I. I. [**Proteolytic ferment from cotton seedlings**] *Doklady Akad. Nauk SSSR.* 1949, **68**, 885-8 [Russian]

590 Tewfik, S., and Stumpf, P. K. **Carbohydrate metabolism in higher plants. II. The distribution of aldolase in plants.** *Amer. J. Bot.* 1949, **36**, 567-71. [Univ. Calif., Berkeley]

Aldolase, the enzyme that catalyzes the reversible reaction: fructose diphosphate ⇆ 2 triosephosphate, is widely distributed in the plant kingdom in all phyla (including the fungi) and in a variety of plant organs. In the leaf cell it was found only in the cytoplasmic fraction and not in the chloroplast body. It appears in highest concentrations in actively growing parts of plant tissues. The widespread occurrence of aldolase suggests that hexoses in plants undergo a phosphorylitic breakdown similar to that in bacteria and yeast.—D.B.

591 Rubin, B. A., Sokolova, V. E., and Saveljeva, O. N. [**Characteristics of carbohydrate metabolism in the beet plant with relation to temperature**] *Doklady Akad. Nauk SSSR.* 1949, **67**, 893-6 [Russian].

Observations on (1) the synthesis and disintegration of saccharose in beet leaves and roots in the morning and at night, under temperatures ranging from 10° to 40°C.; and (2) the intensity of ferment transformations in tissues of beet leaves and roots at different dates (9 June, 1 July, 17 Aug.), suggest that general productivity and level of sugar content in the root are related primarily to the process of saccharose disintegration in leaves. See also *Fld Crop Abstr.* 2, Abs. 1391.—M.H.

592 Kuprevič, V. F. [**Extra-cellular ferments of roots in higher autotropic plants**]. *Doklady Akad. Nauk SSSR.* 1949, **68**, 953-6. [Russian] [Komarov Bot. Inst., Acad. Sci. U.S.S.R.]

The work contains a table in which is recorded the activity of different ferments in the roots of several plants, including *Avena sativa*, *Triticum* sp., *Hordeum* sp., *Trifolium pratense*, *Vicia faba*, *Linum usitatissimum*, and *Calluna vulgaris*.—M.H.

593 Kolobkova, E. V. [**Proteolytic ferments of leaves of phylogenetically remote forms of plants**] *Doklady Akad. Nauk SSSR* 1949, **68**, 107-9. bibl. 4. [Russian]

Many researches have supported the statement of Blagoveščenskiĭ that plant forms belonging to energetically developing and phylogenetically young groups possess a greater energy potential than do the phylogenetically old forms. The energy level is proportional to the quality of the ferments. The higher this quality, the greater the strength by which the ferment lowers catalytic activity of its reaction and the less the coefficient μ in Arrhenius' equation or the temperature coefficient Q_{10} of van t'Hoff. The effect of severe conditions (continental climate of the high mountains of Central Asia) on proteolytic ferments of leaves of different plants was studied in the summer of 1948. Determination was made of temperature coefficients of proteolytic ferments in leaves of species in the Leguminosae, Rosaceae and Ranunculaceae, which families differ in their phylogenetic development. In the Leguminosae Q_{10} fluctuates between 1.35 (in *Vicia kokanica*) to 1.94 (in *Lathyrus pratensis*). *Astragalus* was exceptional in giving high values for Q_{10} and μ. This is explained by the fact that the plants were at a late stage ontogenetically and, according to Blagoveščenskiĭ, old leaves show a higher thermal coefficient than do young ones. In addition to the above tests, the following data on total N in mg. per gram of dry substance were determined: *Lathyrus pratensis*, 31.31; *Astragalus severzovi*, 34.35; *Hedysarum semenovi*, 34.38; *Vicia kokanica* 35.48; *Medicago tianshanica*, 37.05; *Oxytropis immersa*, 42.92; *Astragalus sieversianus*, 47.90. The N content of Leguminosae in the mountains is higher than that of Ranunculaceae, being on an average 38 mg. in 1 grm. dry substance in Leguminosae and about 25 mg. in Ranunculaceae.—M.H.

594 Voblikova, T. V. [**Activity of peroxidase in mountain plants of western Tjanj-šan.**] *Doklady Akad. Nauk SSSR* 1949, **68**, 557-60. [Russian] [Central Bot. Garden, Acad. Sci. USSR]

The data presented support the theory of Blagoveščenskiĭ that phylogenetically young plant families have a lower thermal coefficient and, consequently ferments of higher quality compared with phylogenetically old families. There are, however, exceptions to this general rule within each family. —M.H.

595 Kursanov, A. L., and Zaprometov, M. N. [**Translocation of nitrogenous substances in plants**] *Doklady Akad. Nauk SSSR.* 1949, **68**, 1113-6. [Russian] [Bach Biochem. Inst., Acad. Sci. USSR]

The investigation was made during 1947-8 with wheat and rye grain collected at the beginning of wax ripeness. Asparagin and some amino-acids were studied because at this stage of growth these substances should be transported vigorously to the developing grain. There is an indication that movement of amino-acid within the plant does not depend on the flow of water in the transpiration current. The work is being continued.—M.H.

596 UDENFRIEND, S., and GIBBS, M. **Preparation of C^{14} uniformly labelled fructose by means of photosynthesis and paper chromatography.** *Science* 1949, **110**, 708 bibl. 6. [Dept. Biochem, Washington Univ. Med. Sch., St. Louis, and Biol. Dept., Brookhaven Nat. Lab., Upton, N.Y.]

597 HAGEN, C. E., CLAGETT, C. O., and HELGESON, E. A. **2, 4-dichlorophenoxyacetic acid inhibition of castor bean lipase.** *Science* 1949, **110**, 116-7. [North Dakota Agric. Coll., Fargo.]

The technique of Longenecker and Haley (*J. Amer. Chem. Soc.* 1935, 57, 2019) was adopted. The substrate was olive oil. At very low concentrations, 2, 4-D effectively inhibited lipase activity. The butyl ester of 2, 4-D was inactive as a lipase inhibitor until it had been hydrolysed to 2, 4-D. —K.J.S.

598 STOUT, M. **Relation of oxidation-reduction potential, respiration, and catalase activity to induction of reproductive development in sugar beets.** *Bot. Gaz.* 1949, **110**, 438-49. [U.S. Sugar Plant Field Lab., 1810, South Main Street, Salt Lake City, Utah]

Respiration, catalase activity, and oxidation-reduction potential were measured in relation to thermal induction of reproductive development (exposure to cool temperatures) and reversal (exposure to warm temperatures) in biennial sugar beets. Similar measurements were made in relation to photoperiodic induction (exposure to continuous illumination) in annual beets. Respiration rate and catalase activity increased and the oxidation-reduction potential decreased as thermal induction progressed. Reversal of thermal induction was correlated with corresponding changes in values of those physiological measurements. Respiration rate increased and oxidation-reduction potential decreased during photoperiodic induction in annual beets. Changes in catalase activity were indefinite in this study. Induction processes are correlated with changes in the oxidation-reduction balance of certain regions of the plant, and these changes seem to agree with present chemical theory. The more reduced state seems to be correlated with an increase in induction toward reproductive development.—Author's summary.

599 ROUBAIX, J. de, and LAZAR, O. Métabolisme respiratoire de la betterave sucrière II. Respiration de la racine et du collet au cours des deux années de végétation. [**Respiration and metabolism in the sugar beet. II. Respiration in root and top during the two years' growth.**] *Sucr. belge* 1949, **69**, 157-65. [Raffinerie Tirlemontoise]

At certain well-defined stages of growth between germination and seed formation comparison was made of the intensity of respiration and other physiological activities particularly those in the root. These latter included absorption of mineral elements, the influence of minor elements, the part played by enzymes, and accumulation of sugar. There were two series of experiments: plants grown in culture solution for 1 year and plants grown in soil for 2 years. Two facts stand out from the results: (1) metabolism increases from the commencement of growth; and (2) the respiratory quotient remains lower than unity up to the twelve-leaf stage and then becomes stable round about unity right up to the end of seed formation. At the twelve-leaf stage the root begins to fill out, its sugar content is then sufficient to supply the essential materials for respiration.—D.B.

600 STRUCKMEYER, B. Esther, HILDEBRANDT, A. C., and RIKER, A. J. **Histological effects of growth-regulating substances on sunflower tissue of crown-gall origin grown *in vitro*.** *Amer. J. Bot.* 1949, **36**, 491-5, bibl. 15. [Univ. Wisconsin, Madison]

601 LEOPOLD, A. C., and THIMANN, K. V. **The effect of auxin on flower initiation.** *Amer. J. Bot.* 1949, **36**, 342-7, bibl. 19. [Hawaiian Pineapple Company, Honolulu, and Harvard Biol. Lab., Cambridge, Mass.]

Volumes of known concentrations of auxin in water were introduced into barley (*Hordeum vulgare*) and teosinte (*Euchlaena mexicana*) plants at the time when they were being photoperiodically induced to flower. The effects of the treatments were ascertained by counting the number of flower primordia established after 3 weeks. Concentrations of auxin weaker than 1 mg./l. of *α*-naphthaleneacetic acid or 10^{-3} M indoleacetic acid promoted flowering by as much as 35 per cent. Stronger concentrations of auxin inhibited flowering in both plants. Complete elimination of flowering could be obtained with 400 mg./l. naphthaleneacetic acid. Applications of auxins were not able to induce flowering in barley or teosinte plants exposed to day-lengths which prohibited flowering. The promotion of flower initiation by auxin is evidently not a simple bud promotion, for the formation of vegetative buds was not promoted in the same way as that of flower buds. Conditions or treatments which would be expected to cause variations in the amount of auxin in barley plants were observed to be correlated with inverse variations in flowering. Thus, seasonal increases in tillering were accompanied by increases in flowering of as much as 75 per cent ; exposure to very weak X-irradiation increased flowering by as much as 23 per cent ; solutions of the inhibitor coumarin increased flowering by as much as 25 per cent. The strong correlation between flowering and growth suggests that auxin may affect flower initiation in a manner parallel to its effect on growth.—Adapted from authors' summary.—D.B.

602 LEOPOLD, A. C. **The control of tillering in grasses by auxin.** *Amer. J. Bot.* 1949, **36**, 437-40, bibl. 13. [Hawaiian Pineapple Company, Honolulu, 1]

The grasses studied were barley (*Hordeum vulgare*) and teosinte (*Euchlaena mexicana*). It was first demonstrated that the apex on the main axis prevented tillering and that destruction of the apex favoured tillering. Injection of α naphthaleneacetic acid into the position occupied by the apex also prevented tillering. It is concluded that tiller formation is influenced, negatively, by auxin diffusing from the apex.

The effect of daylength was next studied. Experiments were carried out to determine the amount of diffusible auxin produced by leaves under short and under long days. Since the amounts of auxin obtained by diffusion from leaves of grasses were extremely small the *Avena* curvatures obtained were very small. It was confirmed that in the dicotyledonous plant, *Coleus*, the amount of diffusible auxin changed with changing dayength and that photoperiodic conditions which ncreased auxin production in *Coleus* decreased illering in barley. In a 16-hour day tillering was over 70 per cent less than in the 10-hour day, and he addition of auxin decreased tillering still urther. These results are compatible with the possibility that the barley leaves may produce more auxin under long days than under short days. The fact that the addition of auxin to the shortday plants in this experiment did not significantly educe tillering indicates either that the timing nay be critical, or that some factor other than uxin may be involved. There was a seasonal variation in tillering under the natural short day. Tillering in barley increased from October to anuary and then decreased as daylength increased. (This variation also takes place in wheat nd in rice.) · Because tillering in barley is strongly nfluenced by auxin, the seasonal variation in illering suggests the possibility of a seasonal variation in auxin production. While artificially ncreasing the supply of auxin (α naphthaleneaetic acid) in the plants results in decreased tillering he application of auxin antagonists (2, 3, 5 triodobenzoic acid, coumarin, and X-rays) all promoted tillering in barley, and therefore served as tillering agents. Not one of these auxin antagonists, however, produced tillers in teosinte either in long or short days. Plant measurements have shown that the inhibition of tillering by addition of auxin is not due to an inhibition of overall vegetative growth. The results of the experiments show that tillering in grasses is subject to the same auxin relations as are herbaceous dicotyledons.—D.B.

603 MUIR, R. M., HANSCH, C. H., and GALLUP, A. H. **Growth regulation by organic compounds.** *Plant Physiol.* 1949, **24**, 359, bibl. 22. [State Univ. Iowa, Iowa City ; and Panama College, Claremont, Calif.]

The effects were determined of several organic compounds and of the plant auxin (indoleacetic acid) on the growth in length of the *Avena* coleoptile, cell elongation being the criterion of growth. Indoleacetic acid and 2,4-D have equal growth activity ; other substituted phenoxyacetic acids have less. The growth activity of 2,4-D and other phenoxyacetic acids can be related to chemical structure by the supposition that the position on the benzene ring adjacent to the point of attachment of the side chain is directly involved in the growth reaction.—D.B.

604 BONNER, J. **Limiting factors and growth inhibitors in the growth of the *Avena* coleoptile.** *Amer. J. Bot.* 1949, **36**, 323-32, bibl. 15. [Calif. Inst. Technology, Pasadena]

Amino acids, organic plant acids, salts and vitamins which increase and which inhibit the growth response induced by indoleacetic acid have been studied.—D.B.

605 FREELAND, R. O. **Effects of growth substances on photosynthesis.** *Plant Physiol.* 1949, **24**. 621-8. [Northwestern Univ., Evanston, Ill.]

At a concentration of 100 p.p.m. the effects of the acids of 2,4-dichlorophenoxyacetic, indole-3-acetic, gamma (indole-3) n-butyric, beta-naphthoxyacetic and para chlorophenoxyacetic were determined upon apparent photosynthesis and respiration in bean plants. Each growth substance was applied as a mist spray. With the exception of naphthoxyacetic acid all of these growth substances caused a decrease in the rate of apparent photosynthesis in beans. This decrease continued throughout the duration of the experiment which lasted from two to four days. Naphthoxyacetic acid resulted in an acceleration of photosynthesis over a period of three days after which the rate relative to that of the controls became the same as before treatment, —From author's summary.

606 Ducet, G. Études des variations des différentes formes de la choline au cours de la croissance de quelques végétaux. [**Different forms in which choline occurs during growth of certain plants.**] *Ann. agron., Paris* 1949, **19**, 185-259, bibl. approx. 90.

After a literature survey of the subject and a discussion of the methods of analysing for and identifying choline, a report is given of the results of investigations into the distribution of choline in plant tissue during germination, growth, and flower and fruit formation. The plants studied were *Hordeum*, *Glycine* and *Castanea*. The role of choline in the synthesis of lecithin is also discussed. —D.B.

607 André, E., and Kogane-Charles, M. Contribution à l'étude des composés sulfurés volatils des graines de crucifères. [**Volatile sulphur compounds in the seeds of Cruciferae**]. *Ann. Agron., Paris* 1948, **18**, 547-58, bibl. 16. [Lab. " Corps gras-Agriculture " I.N.A., Paris]

This article completes researches from which it is evident that the sulphur extracts of colza and rape contain volatile mercaptans and alkyl sulphides as well as the mustard oils. The presence of these compounds causes error in the volumetric estimation of crotonyl mustard oil. When analysed by three methods (described) there is a clear distinction in the behaviour of the extracts from colza and rape and those from black mustard. These differences in behaviour could be used to detect the addition of seed of colza and rape to mustard seed.—D.B.

608 André, M. E. Le sénevol de la graine de moutarde blanche ou paraoxybenzyl-sénevol. [**Mustard oil from seed of white mustard or paraoxybenzyl mustard oil.**] *Ann. agron., Paris* 1949, **19**, 764-9, bibl. 7. [Lab. des oléagineux métropolitains, I.N.A., Paris]

609 Lakon, G. **The topographical tetrazolium method for determining the germinating capacity of seeds.** *Plant Physiol.* 1949, **24**, 389-93, bibl. 7. [Agric. Coll., Stuttgart-Hohenheim, Germany]

The tetrazolium method is based on the reduction in germinability of seeds due to a gradual dying off of the embryo. The spread of this necrosis can be demonstrated by means of 2, 3, 4-triphenyl tetrazolium chloride. Living cells reduce this colourless compound into the stable non-diffusible red formazan. Living cells therefore become red in colour while non-living cells remain colourless. Red colouration is an indication of viability. The author has improved the procedure to demonstrate which parts of the embryo are at least sufficiently viable to make germination possible.. The method has already been described by Lakon [see *Herb. Abstr.* 10. Abs. 1229 ; 11, Abs. 228] but is described again in order to correct errors which have been introduced in a description of the method by other authors in a more recent publication [see *Herb. Abstr.* 17. Abs. 1443]. In the present paper the method is illustrated by reference to wheat, oats, barley, rye and maize. The advantages of the tetrazolium method are then summarized.—D.B.

610 Wort, D. J. **The response of buckwheat to treatment with 2,4-dichlorophenoxyacetic acid.** *J. Amer. Bot.* 1949, **36**, 673-6, bibl. 9. [Univ. Brit. Columbia, Vancouver, B.C.]

Buckwheat (*Fagopyrum esculentum*) was sprayed with an aqueous solution containing 1000 ppm. of the sodium amine of 2,4-D. Analyses were made of plants harvested at time of spraying and 1, 2, 4, 8, and 12 days thereafter. Drooping of the plants was quickly followed by bending and curling of the stems and corkscrew-like twisting of the leaf petioles. Stem turgor increased and ease of snapping suggested a change in the character of the cell wall. Necrosis of the first internode prevented translocation to the upper stem and leaves. Longitudinal splitting of the stems hastened their desiccation. Spraying prevented the opening of the flower buds. The nitrogen T/C value increased within the stem and root, reaching a maximum of about 140 in 4 to 8 days. Within the leaf there was a steady decline of the nitrogen value. T/C values for total sugars increased in the stems only, attaining a maximum of 129.3 in 2 days. The final values in stem, root and leaf were between 30 and 40. Starch-dextrins responded very much as did the sugars. [T/C value = percent of a substance in the treated plants (T) divided by per cent of that substance in the control plants (C), the quotient being multiplied by 100.]—From author's summary.

611 Singh, S., and Greulach, V. A. **Effects of alphanaphthaleneacetic acid and alphanaphthaleneacetamide on the development of the cotton plant.** *Amer. J. Bot.* 1949, 646-51. [Univ. N. Carolina, Chapel Hill]

Plants of Stoneville 2B cotton in a greenhouse were sprayed with 5, 10 and 20 ppm. of a-naphthaleneacetic acid and a-naphthaleneacetamide when 57 days old and again when 71 days old. The acid produced more marked effects than the amide. The first application of the acid (but not the acetamide) produced strong epinastic effects, but the second produced less marked effects. Growth of both the main stem and the fruiting branches were inhibited by the growth substances. The treatments did not influence area per leaf, but as a result of a decrease in the number of nodes on the branches there was a reduction in the number of leaves per plant. However, leaf weight per unit area and per plant increased with the concentration of the growth substances, and the treated plants had thicker, darker green, and more leathery leaves, which wilted less easily. Total dry weight of the plants was not affected, and in the reproductive organs was reduced only by 20 ppm. of the growth substances. The treatments decreased the number of flowers per plant, but there was no great difference in the umber of mature bolls per plant, so the percentage of bolls set was higher in the treated plants. The inal yield of seedcotton per plant was not affected ignificantly by any treatment, but it was reduced lightly by 20 ppm. of the acid, and increased lightly by 5 ppm. of the amide. The treatments ncreased the weight per seed and the number of motes per boll, but the number of seeds per boll lecreased in proportion. The treatments did not ave a significant influence on the boll shed period, oll maturation period, weight of seedcotton per oll, lint index, or the tensile strength, length, or niformity ratio of the fibres.—Authors' summary.

12 KELLY, Sally, and AVERY, G. S. Jr. **The effect of 2, 4-dichlorophenoxyacetic acid and other physiologically active substances on respiration.** *Amer. J. Bot.* 1949, **36**, 421-26. [Vassar College, Poughkeepsie, New York, and Brooklyn Bot. Gard. New York]

,4-dichlorophenoxyacetic acid (2, 4-D) is shown o have both stimulatory and inhibitory effects on he respiration of pea and oat tissues, depending pon the concentrations employed. A concentra-ion of 1000 mg. per l. is inhibitory; concentra-ions of 100 to 200 mg. per l., and lower (down to .3), stimulate oxygen uptake in oat tissue; and oncentrations of 10 mg. per l., and lower (down to .0001), are stimulatory to pea tissue. An 18 to 20 er cent stimulation in oat tissue requires at least 000 times the concentration of 2,4-D needed to pro-uce the same stimulation in pea tissue. Maximum timulation of respiration approximates 50 per cent. ea tissue, in addition to responding to much lower oncentrations of 2, 4-D than oat tissue, shows a reater magnitude of response. Dinitrocresol (0.5 o 10 mg. per l.) and dinitrophenol (0.1 to 1.0 mg. er l.) have a greater stimulatory effect on oat ssue respiration than has 2, 4-D, and inhibition ets in at lower concentrations than for 2, 4-D. In e presence of dinitrocresol, the stimulation of espiration by 2, 4-D is additive.—Authors' sum-ary.

13 ROSSMAN, E. C., and SPRAGUE, G. F. **Effect of 2, 4-D on yields of maize in the succeeding generation after treatment.** *Plant Physiol.* 1949, **24**, 770-3. [Iowa Agric. Exp. Sta., Ames; and U.S. Dept. Agric., Bur. Plant Ind. etc.]

he use of 2, 4-dichlorophenoxyacetic acid for weed control in hybrid seed corn crossing fields has not been recommended generally. The reluctance to use the herbicide in seed fields has been prompted by fear of damage to the valuable seed corn crop in the year in which the treatment is made, and the possibility of deleterious effects in seed produced on treated parental plants and in plants of the succeeding generation. On the basis of one year's data, the results indicate that in some cases there was a carry-over effect on the succeeding crop after spraying corn plants with 2, 4-D. Significant reductions in yield of grain occurred in some of the single crosses, while others were apparently not affected. Yield reductions were more serious as a result of 2, 4-D sprays applied at the six-to eight-leaf stage the previous year than were those applied at the later stages of plant development. Losses in yield were associated with reductions in stand. See also *Field Crop Abstr.* 2, Abs. 1262. —Authors' summary.

614 MURRAY, Mary A., and WHITING, A. Geraldine. **Effect of 2, 4-dichlorophenoxyacetic acid on root development in young corn plants.** *Bot. Gaz.* 1949, **110**, 404-26, bibl. 21. [Univ. Chicago]

Leaves of plants of *Zea mays* were sprayed with a 1 per cent solution of the butyl ester of 2, 4-D. One series, grown in the garden, was treated at the four-leaf stage, while two other series, grown in the greenhouse, were treated at the four- and seven-leaf stages. Spraying caused injury to the leaves and bending of the stem at the nodes. The major effect, however, was swelling at the nodes accompanied by stimulation and malformation of the adventitious roots which develop at the base of the internodes. Spraying of younger leaves caused more injury than did spraying of older leaves. In both young and old plants the response was localized to the internodes above or below the node from which the sprayed leaves emerged. This localized response is unlike the extensive telemorphic response to 2, 4-D in dicotyledons. These results lead to information of practical value on the use of 2, 4-D as a herbicide. If plants are sprayed in their early stages of growth, i.e. through the first-to fifth-leaf stages, the brace root system is injured, resulting in smaller-sized mature plants and consequent reduction in yield.—D.B.

615 GALSTON, A. W. **Indoleacetic-nicotinic acid interactions in the etiolated pea plant.** *Plant Physiol.* 1949, **24**, 577-86, bibl. 18. [Calif. Inst. Tech., Pasadena 4]

Various physiological interactions between indoleacetic acid (IAA) and nicotinic acid (NA) have been demonstrated in the etiolated pea epicotyl. For example, NA enhances the root initiation activity of IAA (synergism), but IAA reverses the bud growth stimulation produced by NA (antagonism). Evidence from bioassays indicates that tryptophan may be converted rapidly to IAA and slowly to NA. It is suggested that the various IAA-NA interactions may be explained on the basis of their origin from a common precursor, tryptophan.—From author's summary.

616 KELLY, Sally. **The effect of temperature on the susceptibility of plants to 2, 4-D.** *Plant Physiol.* 1949, **24**, 534-6. [Vassar College, Poughkeepsie, N.Y.]

Lolium perenne, *Eleusine indica* and *Phaseolus vulgaris* were chosen because of their different reactions to this weed killer. All three were more susceptible to 2, 4-D at higher than at lower temperatures.—D.B.

617 CURRIER, H. B. **Responses of plant cells to herbicides.** *Plant Physiol.* 1949, **24**, 601-9. [College of Agric., Univ. Calif., Davis]

In approaching the problems of weed killing through the techniques of cellular physiology, visible effects of four currently important herbicides on several types of plant cells were studied. The visible effects of 2, 4-dichlorophenoxyacetic acid, 4-6-dinitro-2-sec. butyl phenol, pentachlorophenol, and O-isopropyl N-phenyl carbamate on several types of tissues are described. The attempt is made to group the responses under the heads (a) stimulation, (b) retardation (reversible injury), and (c) premortal (irreversible injury). Observations of vacuolar contraction, vacuolation, granulation, plasmolytic behaviour and other phenomena indicate increasing cytoplasmic hydration during phase (a), declining toward the end of phase (b), and a marked decrease in (c). It is hoped that the overall view of discernible cellular response obtained throughout a wide concentration range will provide a working basis for studies on more specific problems.—From author's summary.

618 NOGGLE, G. R., and WATSON, S. A. **The relationships of riboflavin and ascorbic acid to carbohydrate and nitrogen fractions in immature oat plants as influenced by mineral deficiencies.** *Plant Physiol.* 1949, **24**, 265-77, bibl. 39. [Univ. Illinois, Urbana]

After 3 weeks' growth in a complete nutrient solution followed by a further 3 weeks in solutions lacking single nutrient ions, leaves, stems and roots of the plants harvested from each solution were analysed for soluble and insoluble nitrogen and for carbohydrate fractions. The relationship between these fractions and ascorbic acid and riboflavin was examined. There was a high positive correlation between riboflavin and the total and insoluble nitrogen concentrations, no significant simple correlation between ascorbic acid and the sugar fractions, and a significant negative partial correlation between ascorbic acid and the sugar fractions when the interfering relationship of magnesium to sugar was removed.—D.B.

619 ERGLE, D. R., and EATON, F. M. **Organic acids of the cotton plant.** *Plant Physiol.* 1949, **24**, 373-86, bibl. 26. [Bureau of Plant Ind.; and Texas Agric. Exp. Sta., College Station]

Organic acids, on the basis of dry weight, have been found to be present in the cotton plant in successively lower concentration in the leaves, petioles, flowers, stems, roots, young bolls, seed kernels, and lint. Leaves of cotton frequently contain 20 per cent of organic acid on the basis of dry weight. Malic acid is usually present in greatest amount and tends to constitute 30 to 40 per cent of the total organic acid. The behaviour of these acids has been studied by means of experiments wherein such factors as moisture supply, mineral nutrition, fruitfulness and respiration were varied.—Quotations from text and summary.

620 WITHNER, C. L. **Movement of P^{32} in maturing corn plants.** *Plant Physiol.* 1949, **24**, 527-29. [Brooklyn College, Brooklyn 10, N.Y.]

Graphs show the concentration of P^{32} in successive samples of (a) the leaves and stems and (b) the reproductive portions (whole ear, cob kernels, tassel and husks). Radioactive phosphorus increased in concentration in the plant, reached a maximum in about 12 days and then declined. A residual amount of radio activity remained in the plant cells after the ears had matured and the foliage had begun to dry.—D.B.

621 YEMM, E. W. **Glutamine in the metabolism of barley plants.** *New Phytol.* 1949, **48**, 315-31. [Bot. Dept., Univ. Bristol]

Evidence indicates that glutamine plays an important part in the metabolism of nitrogen during the normal growth and development of barley plants. Glutamine is readily formed as a result of secondary breakdown of tissue protein in senescent leaves rich in carbohydrates. The amide is an important component of the reserve proteins in the grain, and the changes of nitrogenous constituents during ripening and germination suggest that the amide occupies a key position in the interconversion of amino-acids. Under suitable conditions barley roots elaborate the amide rapidly when they assimilate nitrates or ammonia. It is probable that a substantial proportion of the nitrogen reaching the meristematic parts of the plant, or other centres active in protein synthesis, is in the form of glutamine. There is evidence that the amide is one of the important links between the metabolism of carbohydrates and proteins; the cell mechanisms engaged in the synthesis of glutamine are considered in this regard. Both from the nature of the precursor, α-ketoglutaric acid, and the enzyme systems of oxidation reduction and phosphorylation, the formation of glutamine may be closely integrated with the breakdown of carbohydrate and cell respiration. It is concluded that these interlinked mechanisms are important in relation to the wider problem of the co-ordination of the metabolism of carbohydrate and proteins in the plant.—Author's summary.

622 EATON, S. V. **Effects of phosphorus deficiency on growth and metabolism of sunflower.** *Bot. Gaz.* 1949, **110**, 449-64, bibl. 35. [Hull Bot. Lab., Univ. Chicago]

Changes in appearance and size of leaves and stems and in the top-root ratio are described. An account is given of the chemical constitution of the phosphorus-deficient plants, as regards carbohydrate, nitrogen and phosphorus fractions. Methods of analysis are given. The information on the chemical changes which the plant undergoes under phosphorus deficiency is used to explain these deficiency symptoms. Unlike other plants suffering from phosphorus starvation, *Helianthus annuus* showed no accumulation of the soluble nitrogen fractions in the stems of phosphorus-deficient plants.—D.B.

623 ŠČERBAKOV, A. P. [**The effect of calcium and magnesium on the content of chlorophyll and yellow pigments in soybeans leaves**] *Biohimija* 1949, **14**, 331-7. [Russian] [Forest Institute, Acad. Sci., Moscow]

624 MITCHELL, H. L. **Determination of carotene in sweet potatoes.** *Plant Physiol.* 1949, **24**, 323-6, bibl. 8. [Kansas State College, Manhattan]

Carotene content of *Ipomoea batatas* was determined by the Mitchell and King method (*Anal. Chem.* 20, 637-8, 1948) and by the Wall and Kelley method (*Ind. Engng Chem.*, Anal. Edit., 15, 18-20, 1943). Results are summarized as follows "The Mitchell and King procedure for determining carotene in alfalfa and cereal grasses must be modified for use with the sweet potato. Autoclaving before drying caused gelatinization of the starch, which reduced the drying rate and resulted in a horny material from which the carotene was extracted incompletely. When autoclaving was eliminated, the method yielded results in good agreement with the Wall and Kelley procedure. Elimination of this step was possible because of the absence of carotene destroying enzymes in the sweet potato."—D.B.

625 JONES, L. H., SHEPARDSON, W. B., and PETERS, C. A. **The function of manganese in the assimilation of nitrates.** *Plant Physiol.* 1949, **24**, 300-6. [Agric. Exp. Sta., Univ. Massachusetts, Amherst]

Soybean plants were grown in Shive's R_5S_2 solution and in a calcium nitrate solution with an oil layer on top to exclude the oxygen of the air. Nitrites in large quantities accumulated and the plants in these solutions showed yellow leaves indicating nitrogen deficiency, and brown roots indicating oxygen shortage. The introduction of manganese salt into these solutions prevented the accumulation of nitrites and allowed the plants to grow in a healthy manner for the time of the experiment ; the tops were green and the roots silvery white. This work supports the view that manganese is a catalyst without which the orderly reduction of nitrate to amino compounds either does not take place or is greatly reduced in speed. —Authors' summary.

626 ADAMS, G. A., and CASTAGNE, A. E. **Determination of cellulose in straw holocellulose.** *Canad. J. Res.* 1949, Sec. B. **27**, 907-14.

627 ADAMS, G. A., and CASTAGNE, A. E. **Determination of lignin in cereal straws.** *Canad. J. Res.* 1949, Sec. B. **27**, 915-23.

628 ADAMS, G. A., and CASTAGNE, A. E. **Distribution of methoxyl and uronic acid groups in cereal straws.** *Canad. J. Res.* 1949, Sec. B., **27**, 924-32.

629 SPENCER, E. Y. and GALGAN, M. W. **Relations of thiamine content in Saskatchewan wheat to protein content, variety, and soil zone.** *Canad. J. Res.* 1949, Sec. F. **27**, 450-6. [Chem. Dept., Univ. Saskatchewan, Saskatoon]

630 GRANT, M. N. and MCCALLA, A. G. **Yield and protein content of wheat and barley. 1. Interrelation of yield and protein content of random selections from single crosses.** *Canad. J. Res.* 1949, Sec. C. **27**, 230-40. [Univ. Alberta, Edmonton, Alta.]

631 RODRIGUEZ, L. D., HUNT, C. H., and BETHKE, R. M. **The protein, niacin, and pantothenic acid contents of corn of inbred lines.** *Cereal Chem.* 1950, **27**, 67-70. [Ohio Agric. Expt. Sta., Wooster]

632 PINCKNEY, A. J. **Wheat protein and the biuret reaction.** *Cereal Chem.* 1949, **26**, 423-39. [U.S. Dept. Agric., Beltsville, Maryland]

MORPHOLOGY AND HISTOLOGY

633 SHIELDS, Lora M., and DEAN, H. L. **Microtome compression in plant tissue.** *Amer. J. Bot.* 1949, **36**, 408-16, bibl. 14. [New Mexico Highlands Univ., Las Vegas (L.M.S.) and Univ. Iowa, Iowa City (H.L.D.)]

Evidence is given to show that microtome compression of plant tissue in Fisher Tissuemat is not so great as when embedded in paraffin.—D.B.

634 CORMACK, R. G. H. **The development of root hairs in angiosperms.** *Bot. Rev.* 1949, **15**, 583-608, bibl. 103. [Univ. Alberta]

A review which discusses the subject from the development standpoint. The material has been grouped under the following headings: the epidermis, chemical composition of root hair cell walls, factors affecting root hair development, and the mechanism of root hair development.—D.B.

635 SASS, J. E., and SPRAGUE, G. F. **Histological development of "accessory blade" and associated abnormalities in maize.** *Iowa St. Coll. J. sci.* 1949, **23**, 301-9. [Iowa Exp. Sta.]

A stock of maize derived from an introduction from Chosen (Korea), exhibits morphological abnormalities of the embryo and seedling. The abnormalities are the result of either suppression or hyperactivation of meristems, involving the marginal and basal meristems of foliar organs, as well as the massive apical meristems of the axis. There is no consistent relation between the category of the organ involved and the nature of the aberration. The apical meristems and the margins of the scutellum exhibit only suppression, the margin of the coleoptile is subject only to hyperactivity, and the marginal meristems of the foliage leaves may have either suppression or hyperactivity. The controls that normally initiate and terminate meristematic activity, and govern the orderly sequence of organogeny, are obviously out of balance. The available evidence gives no clue to any physiological basis for these abnormalities. Further embryological studies now in progress will afford a more complete classification of populations and permit genetic analysis.—From authors' discussion.

636 CHALAM, G. V. **Germination of double grained paddy in relation to the anatomy of lemma and palea.** *Curr. Sci.* 1949, **18**, 401-2. [Land Reclammation Scheme, Damodarpur, P. O. Sukinda, Cuttack (Orissa)]

There is indication that lignified hypodermal tissue of the palea forms a mechanical obstruction to growth of the embryo located in the secondary kernel facing the palea.—M.H.

637 LAMBA, P. S. **The relation of glume measurements to kernel shape and size in wheat.** *Agron. J.* 1949, **41**, 167-8. [Dept. Agron., Univ. Wisconsin, Madison, Wisconsin]

Forty-four varieties of wheat belonging to four species were studied. There were highly significant positive correlations between corresponding measurements of glume and kernel length, width and volume index, and between glume volume index and kernel weight. Varieties were classified on grain shape as elliptical, ovate or oval and these groups in this order showed a decrease in glume length and a corresponding increase in glume width and depth.—R.N.H.W.

638 BALL, E. **The shoot apex and normal plant of *Lupinus albus* L., bases for experimental morphology.** *Amer. J. Bot.* 1949, **36**, 440-54, bibl. 64. [Univ. N. Carolina, Raleigh]

639 MUNERATI, O. [deceased]. Les anomalies chez la betterave. [**Abnormalities in the beet.**] *Publ. Inst. belge Amélior. Better.* 1949, **17**, 31-7. [English summary, 37] [late of Exp. Sta. Beet Cultivation, Rovigo, Italy]

Certain abnormalities are briefly described and illustrated and the degree to which they are inherited is indicated. The abnormalities concern the cotyledon (tricotyledony, foliar outgrowths, and hypertrophy); shape of leaves (plantain-like and ribbon like); hairiness (long and short); foliar outgrowths; and black skin to the beet root.—D.B.

640 AYYANGAR, G. S. **Some observations on stomata found on cotton ovules.** *Indian Cott. Grow. Rev.* 1948, **2**, 187-92.

First signs of the formation of stomata were noticed in ovules of Cambodia cotton (*Gossypium hirsutum*) 2 days prior to flowering and the formation stages are shown in plate drawings. A comparative study of the formation, development and distribution of stomata in other varieties such as *G. barbadense*, *G. arboreum* var. *neglectum* and *G. purpurascens* revealed some interesting differences. Variations in the size and depth of the air chambers, in the size of the guard cells, in the production and transformation of subsidiary cells, and in the mode of blocking air chambers below the stomata were observed.—M.E.E.

ECOLOGY

641 ARCHIBALD, E. E. A. **Plant populations. II. The estimation of the number of individuals per unit area of species in heterogeneous plant populations.** *Ann. Bot., Lond.* 1950, **14**, 7-21. [Bot. Dept. Univ. Coll. London]

642 **Gaussen**, H. Projects pour diverses cartes du monde à 1/1,000,000^e la carte écologique du tapis végétal. [**Plans for different world maps on the scale 1/1,000,000. The ecological map showing vegetal cover.**] *Ann. agron., Paris* 1949, **19**, 78-101, bibl. 17. [Univ. Toulouse]

A world topographical map on this scale is being prepared, a little at a time, by different countries under the auspices of the International Geographical Union. The author puts forward schemes for world maps on this same scale for geology, climate, vegetal cover, soils and agriculture. This article pays most attention to the vegetation map. The bibliography contains mostly recent papers on cartography by Gaussen.—D.B.

643 **Dahl**, Eilif. **A new apparatus for recording of ecological and climatic factors, especially temperature.** *Science* 1949, **110**, 506-7. [Bot. Lab., Univ. Oslo, Norway]

644 **Godard**, M. Microclimats et mesoclimats du point de vue agronomique. [**Microclimates and mesoclimates studied from the agricultural standpoint.**] *Ann. agron., Paris* 1949, **19**, 578-603, bibl. 39. [Station de Bioclimatologie agricole de Bel-Air, Montpellier]

The study of microclimate is concerned with the layer of the atmosphere surrounding the aerial organs of the plant. It extends from soil level to a height of about 1.50 m., exceptionally 2 m., above the soil. This is the effective climate for the plant. Instruments are described for measuring the temperature of the plant itself and of the air immediately above the soil, the humidity of the air, and the velocity of wind. An account is given of the changes in temperature, humidity, and velocity of wind with height from surface of soil. This variation with height above soil level (termed the "profile of the climatic elements") shows clearly that the plant lives in a more extreme climate than is indicated by the ordinary climatic readings. Taking temperature as an example, though the mean temperate of any day is approximately the same whether measured at soil level or at 2 m. above the ground, the diurnal variation is greatest at soil level and decreases with height above this level. The plant, therefore, grows in an environment which is likely to have more days of frost and of intense heat than are registered by the ordinary meteorological measurements. Wind velocity, on the other hand, decreases rapidly towards soil level and the number of hours of absolute calm increases. The modifying effect on these "profiles" of various types of plant cover, particularly as regards interception of radiation and rainfall, are discussed, as is the relationship between topography of the land and mesoclimate. [See also *Herb. Abstr.* 16. Abs. 930].—D.B.

645 **Burgos**, J. J., and **Fina**, A. L. de La lluvia artificial. [**Induced rainfall.**] *Almanaque Min. Agric. Argentina* 1949, **24**, 195-202. [Meteor. Serv. Secretariat of Aeronautics (J.J.B.), and Inst. Soils, Directorate General of Laboratories and Research (A. L. de F.), Argentina]

An account of experiments in the U.S.A. to induce rain by dropping dry ice on to clouds from an aeroplane.—G.M.R.

PHYTOGEOGRAPHY

646 **Giacomini**, V. La geobotanica in Italia durante il decennio 1939-1948. [**Geobotany in Italy from 1939 to 1948.**] *Vegetatio*, 1949, **2**, 47-54, bibl. 106.

647 **Egler**, F. E. **Regional vegetation literature. 3. Massachusetts.** *Phytologia* 1950, **3**, 193-237.

This is an annotated bibliography of 304 works concerned with the composition, structure, functions, history and ecologic relationships of the Massachusetts vegetation.—M.H.

648 **Boelcke**, O. Una variedad de "*Sinapis arvensis*" adventicia en Balcarce. [**A variety of *Sinapis arvensis* adventitious in Balcarce.**] *Rev. argent. Agron.* 1949, **16**, 168-72, bibl. 5. [English summary, 172.] [Asst. Prof. Agric. Bot., Univ. Buenos Aires]

The author confirms the existence of *Sinapis arvensis*, mentioned by Hauman (*An. Mus. Cienc. nat.* 1925, 33, 333) for the Province of Entre Ríos, Argentina, and proves that it is the variety *Schkuhriana* of this species. This variety is also found naturalized in the region of Balcarce, Province of Buenos Aires. A description and illustration of the plant are given.—Author's summary.

TAXONOMY

649 **Little**, E. L., Jr. **Nomina conservanda proposals for families of seed plants.** *J. Wash. Acad. Sci.* 1949, **39**, 323-9. [Forest Service, U.S. Dept. Agric.]

650 **Beliz**, J. V. C. M. Sistemática de trigos. I. Classificação e descrição botânica de algumas formas cultivadas portuguesas. [**Systematics of wheat. I. Classification and botanical description of some cultivated Portuguese forms.**] *Melhoramento* 1948, **1**, 42-59, [English version plus summary, 52-8.] 10 pls., bibl. 6. [Bot. Lab., Plant Breeding Station, Elvas, Portugal]

An illustrated description and botanical classification of some Portuguese wheats collected at the

Plant Breeding Station, Elvas, including pure and hybrid forms, are presented in English and Portuguese. The description is based on J. C. e Vasconcellos' work *Trigos portugueses*, Lisboa, 1933. —From author's summary.

651 VASCONCELLOS, J. de C. Actualização da sistemática dos trigos portugueses. [**The systematics of Portuguese wheats, present stage.**] *An. Inst. sup. Agron. Lisboa* 1943, **14**, 137-43. [Received 1949] [Prof., Inst. Sup. Agron., Lisbon]

Since the publication of the author's work on the systematics of Portuguese wheats in 1933 (*Bol. Agric.* 1, 1-150), a new classification of wheats has been published by C. A. Flaksberger in the *Flora of Cultivated Plants*. Vol. 1. Leningrad, 1935. A critical discussion of Flaksberger's system of classification is presented. Work on the systematics of the Portuguese wheats requires to be continued and brought up to date.—G.M.R.

652 FORLANI, R. Ibridi *Triticum* × *Secale*. [**Hybrids *Triticum* × *Secale*.**] *Genet. agr.*, 1948, **1**, 335-43. [English summary, 343]

653 FORLANI, R. Ibridi di *Triticum monococcum*. [**Hybrids of *Triticum monococcum*.**] *Genet. agr.* 1948. **1**, 344-50. [English summary, 350.]

654 FORLANI, R. Frumenti, discendenti da incrocio, riferibili a specie differenti da quelle dei genitori. [**Wheats, obtained from crosses, which can be classified as belonging to species different from those of the parents.**] *Genet. agr.* 1948, **1**, 330-4. [English summary, 334]

655 HSIA, C. A. **Interspecific crosses in *Setaria*. III. Chromosomal variation in *S. italo-faberi*.** *Bot. Bull. Acad. Sinica*. 1948, **3**, 1-11.

See *Plant Breeding Abstracts*.

656 COVAS, G. Observaciones sobre la sistemática del género *Hordeum*. [**Observations on the systematics of the genus *Hordeum*.**] *Rev. argent. Agron.* 1949. **16**. 173-7, bibl. 13. [Inst. Fitotec., Min, Agric., Argentina]

Paper presented to the Second South American Botanical Congress Tucumán, 1948. It is noted that several species of *Hordeum* are imperfectly known, in particular those originating in South America. Attention is drawn to Nevski's division of the genus *Hordeum* into three sections (S.A. Nevski. 1934. Hordeae, in V. L. Komarov, Flora URSS. 2. 590-728), considered by the author to be natural and based on morphological characters, but inadequately defined by Nevski because only species growing within U.S.S.R. territory were studied. The three sections *Stenostachys* Nevski, *Hordeastrum* Doell. and *Crithe* Doell. are redefined and discussed.—G.M.R.

657 LAWRENCE, G. H. M. **Name of the soybean.** *Science* 1949, **110**, 566-7. [Bailey Hortorium, Cornell Univ.]

J. Paclt (*Science*, 1949, 109, 339) has proposed that the name *Glycine max* (L.), as used for the soybean, be rejected as having been based on a *nomen confusum* (*Phaseolus max* L.) and that the name *Glycine soja* (L.) Sieb. et Zucc. be taken up in its place. Perhaps no plant has been subjected to more nomenclatorial buffeting and name-changing than has the soybean—a situation that always is unfortunate, and the more so for a plant of economic importance. The contention is supported that the legitimate name of the soybean is *Glycine max* (L.) Merrill (Lawrence, G. H. M. *Gentes herbarum*, 1949, 8 fasc. 1.)—Extract.

BOOKS AND PERIODICALS

658 BOERGER, A. Selección de conferencias. [**Selected addresses.**] 23 × 17, pp. 484, 1 col. pl. Montevideo: Barreiro y Ramos. 1949. [Director, Inst., Fitotéc. Sem. Nac. La Estanzuela, Uruguay]

This selection of addresses has been published to mark the occasion of the First South American Congress of Research Workers in Agronomy held at La Estanzuela, Uruguay, in November 1949, and to commemorate the great Uruguayan naturalist Damásio Antonio Larrañga, who died in 1848. There are sixteen addresses, delivered at various times, which were either unpublished up to the present or else they appeared in rather inaccessible journals, or as separates. In addition, there is a course of eight lectures on fundamental biological problems and plant genetics delivered in 1948 to the Faculty of the Humanities and Sciences, University of Montevideo. The subjects treated are philosophy, biology and agronomy. Those familiar with the author's work in these fields will rejoice that these addresses have not been left to oblivion. Some of the agronomic work has already been reviewed in this journal or in *Herbage Abstracts*, namely, the papers on: wheat-growing prospects in Brazil (*Field Crop Abstr.* 1. Abs. 150), the demineralization of the continents (*Field Crop Abstr.* 2. Abs. 452), and the establishment of contact between agronomic research and the producer (*Field Crop Abstr.* 2. Abs. 477). Two earlier, illustrated addresses which describe, in 1923 and 1924 respectively, experimental and breeding technique at La Estanzuela are of especial interest. Attention is drawn to an address (delivered during the economic slump, 1931) which is an exposition of the mutual interests of stock raising and cropping, two branches of agriculture which in the Rio Plata region tend to be rivals rather than co-operators, and of the value of diversification and intensification. Two addresses are concerned with agricultural research and the training of the professional agronomist, another discusses the organization of scientific research, and yet another deals with current ideas on genetics, including the so-called "new" Soviet genetics. Most of the papers are fully documented, either in the text or at the end of the different articles. —G. M. ROSEVEARE.

659 PÉREZ ARBELÁEZ, E. Plantas útiles de Colombia. [**Useful plants of Colombia.**] 25 × 18, pp. iv + 537, 80 pls. col. pls. Bogotá, Colombia: Contraloria General de la República, 1947. [Escuelas Vocacionales, Fontibón, Cundinamarca, Colombia.]

This valuable reference book consists of richly illustrated, short general descriptions of 1025 Colombian plants, arranged according to (1) botanical family and (2) vernacular name, followed by the botanical name. There are chapters also on botanical aspects of plant industry and a bibliography of over 400 references to work on the botany and utilization of Colombian plant resources (pp. 23-30). A striking feature of the work is the large number of line drawings by the author and the abundance of excellent photographs, mostly taken by the author and the botanist J. Cuatrecasas. At the end of the book there are excellent indices referring to the paragraphs, which are numbered. One index refers to the uses to which Colombian plants, including field crops, are put.—G. M. ROSEVEARE.

660 SCHMIDT, G. A., and MARCUS, A. Handbuch der tropischen und subtropischen Landwirtschaft. [**Handbook of tropical and subtropical agriculture.**] 2 vols. 25 × 17, pp. 845 and 958. Berlin, E. S. Mittler and Son. 1943.

661 MATHESON, J. K., and BOVILL, E. W. **East African agriculture.** 22 × 14, pp. xvi + 332., 32 illustr., 6 maps, London: Oxford University Press, 1950, 25s.

Two enterprising heads of a well known commercial organization have combined to produce this long-needed and admirable book on European and native agriculture in Kenya, Uganda, Tanganyika and Zanzibar. Their aim has been to produce, not an authoritative text-book or instruction manual, but a descriptive account of agriculture as it exists in East Africa to-day, in short to tell the reader not how crops should be grown but how they are being grown. In their brief survey of the agriculture of so vast a territory the compilers have shown much skill and good judgment. The volume is divided into three main parts, the sub-divisions of which are written by various authorities, some of them past or present members of the agricultural services, others experienced farmers or business men. Part 1, which is introductory, deals briefly with such background subjects as geography, land tenure, white settlement, native labour and welfare, soil conservation, and the all too few agricultural research institutes in a vast territory. Part 2, which is by far the largest, deals much more fully with the so-called European agriculture of East Africa and includes a chapter on the growing of maize, wheat, barley and oats in the Kenya highlands and another on the Tanganyika groundnut scheme. The latter is a concise, objective, and well-documented account of a disappointing and much discussed scheme which was begun without sufficient experimental evidence on which to base it. May it serve as a never-to-be-forgotten reminder to future planners of what may happen when agricultural development in the tropics is based in insufficient experimental evidence. Part 3 is devoted to valuable accounts of African agriculture in the different territories. These accounts, which contain interesting details of African life and customs, should be of much value to sociologists, as well as to those concerned with the improvement of native agriculture.

The several appendixes incorporate geographical data and statistics of rainfall, temperature, population and exports, together with notes on keeping estate accounts and statistics, the feeding of African labourers, and the different weights and measures used in East Africa, British, metric, Arabic and Indian. There are useful tables, maps and charts showing: population distribution, physical features, temperature ranges, natural vegetation, rainfall, barometric pressure and the direction of prevailing winds. Most of the thirty odd illustrations are excellent and the index is good. The tables of production statistics are valuable, but not easy to compare owing to the lack of a uniform system for recording agricultural statistics throughout East Africa.

All profits from this excellent book are to be presented to the East African branch of the British Legion of Ex-servicemen.—A. G. G. HILL.

662 MOOMAW, I. W. **The farmer speaks.** Oxford: University Press, 1949. pp. 199, illus. Rs. 7-8.

This is a study of Indian village life based mainly on the personal narratives of several farmers of Gujarat. Dr. Moomaw analyses these accounts, draws his conclusions and makes various recommendations. The minister for Finance in the Government of Bombay contributes a foreword. —A. G. G. HILL.

663 AZZI, G. Ecologia agraria. [**Agricultural ecology.**] 23 × 15, pp. 204, Città di Castello: Soc. anon. editrice Dante Alighieri, 1944, Italian lire 100. [Received 1949]

The present work, which is less well printed and documented than its predecessor, gives an account of some further developments in ecological research. The meteorological equivalents (expressed in mm. of rainfall, degrees of temperature, etc.) are the basis of climatology from an ecological point of view and indicate exactly when a factor becomes deficient. For instance, the equivalent of drought in the month previous to earing of wheat is 40 mm. of rain. In practice it is generally sufficient to determine the equivalent during the critical periods of plant growth. The drought equivalent of the critical period for maize (the month previous to seed setting) is 46.3 mm. All meteorological data must be adjusted according to latitude, altitude and the exposure of the slopes. On the basis of equivalents it is possible to draw charts showing axes of frequency, climatical axes, the occurrence of a plant phase at a given date, zones having the same ecological conditions, etc. The second part of the book deals with the soil and the third part with yield and the characteristics of cultivated plants. Yield is considered from the standpoint of quantity and quality of the product and quality of the seed. Incompatibility between productivity and resistance is analysed. The last part of the book deals with the combination of factors and the differential analysis of yield. The separate effect of the different components of yield can be studied on the basis of geographical trials. Thus it is possible for the agriculturist to solve problems which concern relate the adaptation of agriculture to environment. A bibliography of 191 references completes the volume.—E. BIASUTTI.

664 AZZI, G. Trattato di ecologia agraria. L'ambiente fisico e la produzione agraria. [**Treatise of agricultural ecology. Physical environment and agricultural production.**] 22 × 15, pp. 594, Turin: Società Editrice Internazionale, 1939. [Received 1949]

665 FRANCK, W. J. Zaaizaad. [**Seed.**] 27 × 17, pp. 630, Zwolle, Netherlands: W. E. J. Tjeenks Willink, 1949, 32s. 6d. [Director, Government Seed Testing Station Wageningen, Netherlands]

This textbook is an enlarged edition of the author's book entitled "Characters for the evaluation of seed and how to judge them," published in 1940. (For a review of the earlier book see *Herb. Abstr.* 10. Abs. 557). The enlargement is so considerable as to make this practically a new book. A new chapter presenting an illustrated account of seed development and structure, and including a table for the identification of seeds of the Cruciferae, precedes chapters on: purity, germination, agricultural value, sanitary condition, moisture content, pedigree or provenance (place of origin), genuineness of variety, selection and classification (in which separate consideration is given to the various grasses, clovers, crop and horticultural plants) weight, size, grading, fibre content, colour, sheen and smell. Appendices comprise: (1) a table of standard requirements in purity, germination and agricultural value for seed determined as of good quality; (2) a list of the names of grasses clovers, crop and horticultural seeds in five languages; (3) a list of North American names of grasses and clovers, with their Latin and Netherlands equivalents; (4) tabulated information on the vitality of flower seeds; and (5) a glossary of words frequently used in seed testing parlance, in Dutch, English, French and German. There is an excellent subject index, an index of genera and species, and a classified bibliography of nearly 2000 references. In addition to this bibliography there are numerous references in the text. The book represents the crystallized experience and study of a lifetime and it is impossible in a short review to give an impression of the very large amount of information it contains, especially on the testing of seed. Attention may perhaps be drawn to chapter 8, however, which treats with pedigree, provenance, and genuineness of variety. For the determination of this last-named character alone five methods of examination are fully described, which study respectively the morphology of the seeds and that of seedlings, the anatomy and histology of seeds, their chemical reactions, and physical methods of examination. The application of these methods is then described in relation to, for instance, the ryegrasses (distinction between *Lolium perenne* and *L. multiflorum*); *Festuca pratensis* (distinction between this species and *Lolium perenne*); *F. arundinacea* (distinction between this species and *F. pratensis*); other *Festuca* spp.; various *Poa* species etc., all in considerable and fully documented detail. Similar information is given for the legumes, the cereals, beet seed and the Brassicas. —G. M. ROSEVEARE.

666 Oldham, C. H. **Brassica crops and allied cruciferous crops.** 22 × 14, pp. 296, London: Crosby Lockwood and Son, Ltd. 1948, 21s.

667 Butler, E. J. and Jones, S. G. **Plant pathology.** 25 × 18. xii × 979. London: Macmillan and Co. Ltd. 1949. £3 3s. 0d.

Mycologists and plant pathologists will remember E. J. Butler's "Fungi and Disease in Plants" published over 30 years ago. Its sub-title was "An introduction to the diseases of field and plantation crops, especially those of India and the East", and botanists working in the tropics must have found it invaluable. When the author returned to Britain from India he started to revise that book, elaborating the general part and substituting for the tropical diseases of the second part those which are important in Great Britain and those common in other countries. Sir Edwin did not live to see the work in its final form and the task of its completion fell to his collaborator Dr. S. G. Jones. Printing and publishing difficulties caused delay and the book did not appear until 1949. The general plan is that of the original, the first part giving an account of principles underlying plant diseases and their control, while the second describes selected diseases of all classes of crops. Part I discusses such subjects as the relationship of the parasite and its host, resistance and susceptibility, the influence of environmental and nutritional conditions on plant diseases, the principles of disease control, virus and deficiency diseases of plants, and it closes with a classification of the fungi, indicating the chief genera. In this general part the bacteria in relation to plant diseases receive only brief mention (19 lines) though specific bacterial plant diseases are mentioned later. Virus diseases and deficiency disorders of plants receive more extended treatment (41 and 34 pages respectively) and the fungi, from their importance as plant parasites, are described at length, with sections on their vegetative structure, reproduction, polymorphism, dissemination, nutrition, mechanism of feeding, enzymes and symbiosis (particularly with references to mycorrhiza). Part II describes particular diseases, the first four chapters being devoted to those of cereals, pasture and forage crops, potatoes, roots and pulses. Other chapters deal with diseases of vegetables, fruit, ornamental and miscellaneous plants and trees. As this part (occupying 600 pages) describes "Selected Diseases" only, it follows that many interesting diseases are not mentioned. Some of considerable economic significance, however, are also omitted e.g. *Verticillium* wilt of potatoes. In the preface it is stated that this book has been framed to meet the requirements of students of mycology, plant pathology, agriculture, horticulture and forestry. It would serve this purpose admirably if only students could afford to buy it. It should, however, be available for reference in every library accessible to biological students. A striking feature is provided by the lavish illustrations from photographs obtained from various sources, and original drawings, to show fungous structure, morbid anatomy of plant tissues and symptoms of plant diseases. Each chapter ends with a bibliography which will enable a student to probe further into any particular line of the general subject. The volume is one that students and specialists alike will appreciate as bringing together the various aspects of plant pathological science. Advisory officers, concerned as they are with maintaining and improving crop production, will also find it helpful.—H. WORMALD.

668 Weston, W. A. R. Dillon. **Diseases of potatoes, sugar beet and legumes.** 21 × 14, viii + 86, London: Longmans, Green and Co. 1948, 4s.

This series of articles gives a straightforward, easily assimilated account of the main diseases to which potatoes, sugar beet and legumes are susceptible. The onset, characteristic appearance and development of the depradations caused by insect pests and parasitic fungi are described and illustrated. The mode of infection is outlined, and the method of control indicated. There is a brief historical survey of the introduction of these crops into the country, and of the discovery and diagnosis of disease. To the layman, the farmer or the student who want a concise, comprehensive, but not highly technical, account of this subject, the book will be of use.—A. D. HOOPER.

REPORTS

669 Empire Cotton Growing Corporation. Progress reports from Experiment Stations: Season 1947-1948. Programmes of Experiments: Season 1948-1949, pp. 137 + v, London, 1949.

The largest number of experimental stations contributing to this work are in Africa, but two stations in the West Indies and one in Australia are also included. The Australian station is at Biloela, Central Queensland, where irrigation is available. Very poor yields were obtained in the rain-grown experiments but with supplementary irrigation a mean lint yield of 570 lb. per acre was obtained. Investigations included experiments on time and rate of spray-irrigation, soil moisture and nitrification studies, trials of commercial varieties and strain hybrids, and entomological studies. Tests of mechanical harvesting and flame cultivation are planned. From the Barberton Station there are reports on Sudan wild cottons, tested under South African conditions.

There are reports from five different research stations in the Anglo-Egyptian Sudan and experiments are also reported from Uganda, Tanganyika and Nyasaland.

Accounts of cotton growing in the West Indies come from Antigua and St. Vincent. Fertilizer, spacing and rotation trials are noted.—M.E.E.

670 SCOTLAND. THE EDINBURGH AND EAST OF SCOTLAND College of Agriculture. Report on the work of the College for the year ending 39th September 1947. pp. 100. Edinburgh.

Research on various field crops was conducted mainly at the Boghall Experimental Farm and at Sourhope. The relationship of moisture and pH to successful cultivation of field beans in sand was investigated in greenhouse studies and under field conditions.

Small-scale weed control trials were laid down in wheat, oats, and barley. Of these cereals, the oats were most succeptible to injury by the herbicide " Weedone." A study of cereal rusts, particularly the black rust (*Puccinia graminis*), was begun and special study was made of dormancy in barley, with particular reference to the method of harvesting the crop and its subsequent treatment. In field experiments with sugar beet, liming gave considerable yield increases on acid soils and the superiority of potassium over sodium chloride on a deficient soil was noticeable. Liming experiments were also conducted with grain crops.—M.E.E.

671 SCOTLAND. Scottish Society for Research in Plant-breeding. Report by the Directors and Report by the Director of Research to the Annual General Meeting 28th July, 1949, pp. 54, Edinburgh, 1949.

GRAIN CROPS. Field trials with oats have established a new variety to be known as " Craigs Afterlea." It ripens early, has medium-sized white grain, and fairly short straw. It is resistant to lodging and is particularly recommended for fertile soils. Selection work with oats and barley is reported. True-breeding lines of *Vicia faba* have been developed and replicated trials are in progress.

ROOT CROPS. Yield trials were carried out with swedes, kales, sugar beet and fodder beet. New strains of swedes are being developed and trials for winter resistance conducted. A search for non-bolting strains of true sugar beet, and the possible use of heavy cropping forms of beet for sugar production on upland farms are being studied. —M.E.E.

672 NETHERLANDS. GRONINGEN, Committee for Sugar Beet Production (Commissie ter Bevordering der Suikerbietenteelt). Report for 1948. *Med. Inst. rat. Suikerprod.*, 1949, 18, 69-122.

The efforts of the Committee have been especially directed towards the discovery of light and simple machines for the small beet grower of northern Holland which will ease the work of sowing, cultivating and harvesting. The report is in five sections.

(1) Weather, yield, diseases and pests. Average yield was above expectations and the sugar content high. The virus disease " yellows" was detected to a small extent only, and that in plants of southern origin, which are always a source of danger.

(2) Trials. Nos. 1157 and 1158 were to test planting distance in conjunction with different applications of N for the varieties Kuhn and Klein Wanzleben E in different localities. A planting distance of 60 cm. is too great for Kuhn and 40 cm. appeared to give the best results, but K.W.E. could be up to 60 cm. apart without depressing results.

In singling trials at Marum and Noordwijk postponement of singling, even by 9 days only, appeared to result in a reduction of root yield, although sugar content was unaffected.

Trials Nos. 1117 and 118 tested the value of *Lolium westerwoldicum*, turnips, *Phacelia*, *Trifolium incarnatum* and *Vicia*, combined with N in doses of 0, 60, 80 and 100 kg. per ha., as green manure for sugar beet. The best results were obtained from the vetch.

Trials are reported on the use of farmyard manure and artificials on humus sand soil, with different times of sowing, namely, 25th March, 16th April and 7th May. The first sowing date gave by far the best results. Farmyard manure did not enhance yield: the reasons for this are discussed.

Straw as manure. In addition to ordinary fertilizers, wheat straw was spread at the rate of 5000 kg. per ha., ploughed in, and the after-effect on sugar beet studied. There was no effect on root or sugar yield, and only a little higher leaf production in the case of the highest application of N plus straw.

Substitution of agricultural salt (*landbouwzout*) for potassium. Two trials are described.

Time of harvesting. In a trial of the four dates Oct. 20, Nov. 1, Nov. 8 and Nov. 15, the highest yields were obtained on November 1st under the weather prevailing in 1948.

Harvesting at different times and in different ways. In some plots beets were lifted so that they still remained upright in the rows, but were not carried until 1, 2, 3 or 4 weeks afterwards; while in the control beets were lifted and carried in the normal way. In yet another plot beets were topped with a special implement and lifted after 3 weeks. Results are tabulated and discussed. The average reduction in root yield from lifting after 9 days was approximately 4 per cent and the reduction in sugar yield 2 per cent only, which is attributed to different climatological circumstances. Similar experiments in Belgium and Germany are discussed. A general conclusion drawn from these experiments is that it is not wise to leave topped beets in the ground longer than one week. Sugar loss can be very considerable under certain weather conditions.

(3) Calibrated seed. Trials of so-called monogerm or segmented beet seed having proved disappointing, trials in 1948 have been concerned with an American method of sieving beet seed to a given fraction (2.5 to 3.8 mm. was chosen in the Netherlands) and subsequently polishing them lightly to achieve even sowing. Seed thus treated is known as calibrated seed. The above mentioned size proved unsuitable, and in 1949 seed of from 3.2 to 3.5 mm. was to be used. Information is presented on (a) the germination respectively of normal and calibrated seed; (b) the sowing of normal and calibrated seed by different methods and machinery; (c) comparison of calibrated and normal beet seed in 1948 (the calibrated more sensitive to drought on account of polishing); (d) seeding rate; (e) the "take" of calibrated seed; (f) sowing machines used; and (g) labour incurred in singling. Although the total number of observations "are on the low side", the impression has been gained that the prospect of obtaining a satisfactory number of plants per hectare is less when calibrated seed is used, racial differences being left out of consideration. The greatest risk appears to be at the coming up or "take" stage.

(4) Topping and lifting. An account is given of trials with three Dutch toppers and five lifters, including the British Martin's, and another by Maynard.

(5) Labour saving under various degrees of mechanization. Among other findings, the Pommritz topping method (devised in Germany) is reported to give a clean leaf crop more rapidly than ordinary manual labour.—G.M.R.

673 FRANCE. Society for the Promotion of the Cultivation of Brewing Barley and Hops in France. Report for the season 1947. Paris. pp. 63.

As a result of the 1946 harvests, three varieties of six-rowed barley (Groningen, Peragis Mittelfruhe and Vogels Agaer) were discontinued in 1947. Of new six-rowed varieties the most interesting were, in this order: 456 Gembloux, Friedrichswerther, Mansholt and Mahndorfer Victoria. Those from Zürich were not satisfactory, being either late or unable to stand low temperature. The performance of varieties in comparative trials is tabulated; Professor Damseaux and Albert proved to be the most satisfactory; Albert, however, was less resistant to low temperature.

Results are also given for manurial trials with organic mercurial compounds for disease control and for the performance of varieties in different parts of the country.—D.B.

674 INDIA. Scientific Reports of the Indian Agricultural Research Institute, New Delhi, for the year ended 30th June, 1947.

The inter-relationship of climate, soils, vegetation and animals is recognized and many experiments in the Agronomy Division of the Institute are connected with the inclusion of grasses and legumes in the crop rotation to maintain soil fertility. Experiments on the phosphatic manuring of legumes were started initially with berseem (*Trifolium alexandrinum*) and later included summer and winter legumes. Green manure crops such as *Vigna sinensis*, *Cyamopsis psoralioides*, and *Phaseolus aureus* had beneficial effects on yields of wheat. Large yield increases were obtained by irrigating wheat, barley and gram (*Cicer arietinum*). Research in the Division of Botany included the study and improvement of Indian wheats and the breeding for disease resistance and other desirable qualities in *Cajanus cajan*, *Linum usitatissimum* and *Zea mays*. The reddening of leaf tips in shaftal (*Trifolium resupinatum*) was studied. The appearance of the symptoms in the early stages is ascribed to nitrogen deficiency resulting from restricted nodule formation.—M.E.E.

675 RHODESIA Agricultural Experiment Station. Annual Report of Experiments. Season 1946-47. By *H. C. Arnold*, Salisbury, 1948, 468-83.

A number of long-term crop rotation experiments show that to maintain fertility on land regularly cropped with maize, phosphate and humus-forming material must be applied constantly. Early results are given of an experiment involving various rotations of maize and grass ley, or maize and legume. Groundnut variety trials and soybean strain trials are reported. New velvet bean hybrids have been tested; they produce more hay than the standard Somerset variety and slightly less seed. Subsequent maize yields showed that velvet beans were as effective a green manure as was sunn hemp, when the latter was sown late enough to escape destruction by beetles.—G.K.G.C.

676 COLOMBIA, Palmira Agricultural Experiment Station. Report June 1948 to June 1949. By *F. Villamil G. Notas agron. Palmira* 1949, 2, 57-69.

Rice. Of seven rice varieties remaining out of twenty-two under trial in the previous year, Early Prolific and Arkansas proved especially valuable on account of their high yield and general agricultural and milling value. Both varieties are acclimatized, 100 per cent pure, and highly resistant to pests and disease. Another trial of seventy-five varieties is in its initial stage.

Maize. Trials of new hybrid varieties are reported.

Experiments in the control of weeds in the pre-emergent stage in maize fields using three different concentrations of 2,4-D, on two different dates, are in progress.

Beans. A trial of eight varieties is reported. To date the principal finding is the earliness of the varieties Shirokintoki and Habichuela.

Cassava. A trial of nine varieties aims at determining (a) the most promising varieties for starch production, (b) at what stage of development yield is best, and (c) what size roots contain most starch. Some interesting observations are made on the vegetative period of different varieties. Some varieties considered late have actually exhibited a shorter vegetative period than early varieties, and vice versa. The 15-month variety Charola, for example, appears to have a shorter growing season at Palmira, and the variety Tempranita (Little Early) will probably prove to be the latest of the nine tested. It is probable that these variations are due to a process of acclimatization. Flowering has not yet taken place.

A compost manurial trial is in progress, three different dressings being employed. Up to the present no appreciable difference has been noted between the plots with heavy and small dressings and the control, but a considerable difference is seen between plots receiving the intermediate dose (40 tons per hectare) and the remainder, the 40-ton plots containing the most vigorous cassava plants.

Another cassava experiment in progress is to test the most economical length of cutting for planting.—G.M.R.

677 MALAYA. Report on Agriculture in Malaya for the year 1947, by *F. Burnett*, pp. 86, Kuala Lumpur, 1949.

A statement of general agricultural policy in Malaya, is followed by a description of agricultural production for the year. Weather conditions were abnormal throughout the country, with localized floods and droughts. Production of rice and of numerous minor crops is described. Rice yields for both wet and dry areas are given and the drainage and irrigation scheme for increasing the rice acreage is described. Experiments conducted at many agricultural stations throughout the country are reported. Plant introductions included *Crotalaria juncea*, *Desmodium* spp., *Cajanus indicus*, *Indigofera endecaphylla*, *Canna edulis*, and *Linum usitatissimum*. Plots of *Axonopus compressus* were established for fodder. Species used in pasture trials included *Paspalum dilatatum*, *Panicum maximum* and *Centrosema pubescens*. There are descriptions of entomological and pathological investigations and an appendix of twenty-five pages giving acreage and yield statistics for the year.—M.E.E.

NEWS ITEMS AND SCIENTIFIC NOTES

International

678 AN INTERNATIONAL CONGRESS FOR THE DEVELOPMENT OF OVERSEAS COUNTRIES was held in Paris in October, 1949. The following papers were included among those presented: The future of groundnut cultivation in Morocco under irrigation, by M. Carrière de Belgarric; the possibility of growing linseed on the upland plateaux of the Cameroons, by M. Pascalet; the present position and future prospects of cassava production in the French overseas territories, by M. Angladette; the future of rice growing in French Africa, by Guillaume; the possibility of basing a cellulose industry on colonial cellulose other than wood, by R. Lacassagne. *O. N. O. -Meded., Batavia.* Dec. 1949.—G.M.R.

679 INTERNATIONAL AGRICULTURAL RESEARCH. THE VOELKENRODE CENTRE. The following institutes have been set up and are in operation:

Soil Fertility Section. Soil Biochemistry: Director, Dr. W. Flaig. Humus Husbandry Research: Director, Dr. W. Sauerlandt. Soil Cultivation: Director, Dr. Fraser.

Plant Culture Section. Grassland and Crop Agronomy: Director, Prof. A. H. Koenekamp. Plant Culture and Seed Production. Director, Prof. W. Schulze.

Animal Management Section. Animal Nutrition: Director, Prof. K. Richter. Animal Constitution (situated at Grub, near Munich): Director, Prof. W. Zorn.

Economics and Sociology Section. Agricultural Market Research: Director, Dr. Arthur Hanau.

Agricultural Engineering Section. Fundamental Research in Agricultural Engineering: Director, Prof. W. Kloth. Tractor Research: Director, H. Meyer. Agricultural Machinery: Director, Dr. Brenner.—J. L. Schofield in *Nature Lond.*, 18 March, 1950.

680 PREPARING SCIENTIFIC PAPERS FOR PUBLICATION. A correspondent has asked this Bureau for a list of references

to works on (a) principles of research (i.e., the general principles which guide research workers in investigating problems), and (b) methods of preparing reports and scientific papers for publication. We have supplied our correspondent with the following list, and we should be pleased if any of our readers would send us details of any other useful publications on these subjects. (a) P. Freedman, The Principles of Scientific Research. pp. 222. Macdonald and Co., Ltd., London. 1949. Price 15s. ; R. H. Griffith, The Practice of Research in the Chemical Industries. Oxford University Press, 1949 ; J. E. Holmstrom, Records and Research in Engineering and Industrial Science. Chapman and Hall, Ltd., 1940. (b) Allbutt, Notes on Writing of Scientific Papers. Macmillan, 1925. 6s. ; Crouch and Zetler, A Guide to Technical Writing. The Ronald Press Co., New York, 1948 ; Fowler, King's English. 3rd. ed. Oxford University Press, 1931, 6s. ; General Notes on the Preparation of Scientific Papers : Published for the Royal Society by the Cambridge University Press : 1950, 2s. 6d. ; Gower, Plain Words. H.M.S.O., 1948, 2s. ; Graves and Hodge, The Reader over your Shoulder. Cape. 1943, 18s. ; R. O. Kapp, The Presentation of Technical Information. Constable and Co., Ltd., 1948 ; J. Raleigh Nelson, Writing the Technical Report. New York and London, 1940, pp. 388 ; Notes upon the Preparation of Reports for Publication. Medical Research Council ; Partridge, Usage and Abusage. Guide to Good English. Hamilton, 1947. 15s. ; S. F. Trelease, The Scientific Paper : how to prepare it ; how to write it ; a handbook for students and research workers in all branches of science. pp. xiii + 152. Baillière, Tindall and Cox, London, 1947. Price 11s. ; S. F. Trelease and E. S. Yule, Preparation of Scientific and Technical Papers, 3rd. ed. Baltimore, 1936. pp. 125 ; Weekly, Saxo Grammaticus. Kegan Paul, 1930, 2s. 6d. ; G. E. Williams, Technical Literature. George Allen and Unwin Ltd., 1948.

France

681 Wheat Varieties for 1949 from the National Experimental Centre, Grignon, are presented in two classes : those sown after peas (after 17th or 18th November) and those sown after beet (after 12th or 13th December). They are arranged in order of their relative yields. At the head of the first list are : Cappelle (Desprez), 109.3 ; Liberator (Laurent), 108.9 ; 191 (Cl. Benoist), 108.0 ; Bersée (Blondeau), 107.7 ; and Nord Desprez, 107.0 ; and at the head of the second list : Liberator, 113.9 ; Vilmorin 23, 108.3 ; Nord Desprez, 107.8 ; Vague d'épis 107.4 ; and Cappelle 107.3. *L'Agric. Prat.* Sept., 1949.—D.B.

Portugal

682 Seed of the following crop plants is offered as 1950 exchange material by the Estação Agronómica Nacional, Sacavém, Portugal.

Oryza sativa, ssp. *indica* (8 varieties) and *japonica* (61 varieties) ; *Tricitum compactum* (5 varieties) ; *T. durum* (90 varieties) ; *T. pyramidale* (4 varieties) ; *T. turgidum* (18 varieties) ; *T. vulgare* (70 varieties) ; *Zea mays* var. *indurata* (6 varieties) and var. *indentata* (16 varieties) ; *Glycine soja* (46 varieties) ; *Linum usitatissimum* (27 varieties).—G.M.R.

Italy

683 Plant Introduction. The supplement to *Ann. Sper. agr.* No. 5, 1949, contains a list of plants and seed introduced into Italy by the Bergamo Exp. Sta. for Maize Cultivation. Numerous varieties of *Zea mays* from Canada, U.S.A., Greece, Australia, and Switzerland, varieties of *Sorghum vulgare* from U.S.A. and other species are included.—E.B.

684 New Wheat Varieties. The Institute for Cereal Cultivation, Frassineto (Tuscany), has produced three new wheat varieties, Grifo, Freccia and Mara, which are being tested in field trials in the Emilia region. These varieties are early, high yielding and resistant to lodging and rust. Descriptions of the first two are given. Both are soft, autumn wheats, with stem height averaging 90 and 95 cm. respectively. *G. Agric. Domen.* Sept., 1949.—E.B.

685 Variations in Wheat Varieties. Variations are taking place in the Mentana variety, which is widely grown. The seed has a high percentage of red and hard grains, and this is causing some consternation. The problem is discussed in *G. Agric. Domen*, July-August, 1949 ; It is not known whether the variations are due to natural hybridization with the "Tevere" variety, which has red seeds, or to variations within the variety itself. In the latter case the law which lays down that "seeds which are declared to be selected must not contain more than 2 per cent of seeds of a different species or variety" would not be involved.—E.B.

686 Chemical Weeding of Rice. In *G. Agric. Domen*, February, 1950, a brief summary is given of successful trials carried out under the supervision of the Phytopathology Observatory of Milan and the Station for Rice Cultivation, Vercelli. All the products tested were based on 2,4-D (and its salts), the dose recommended varying from 0.9 to 1.8 kg. of acid (85 per cent) per ha. In trials of different spraying outfits, an Italian horse-drawn machine appeared to be more suitable for Italian conditions (where rice fields are adjacent to other crops, and trees), despite its smaller working capacity (about 2 ha. per hour) compared with American machines. It is believed that chemical weeding will greatly reduce costs of rice production as with herbicides hand-weeding is reduced to 7 to 15 working days per hectare compared with 40 to 45 days required for complete hand weeding.—E.B.

French Equatorial Africa

687 Groundnuts. The *Rev. Bot. appl.*, Jan.-Feb., 1950, gives information on groundnut cultivation on the Bakete plateaux. This is a region of poor savannah with a few small trees and highly permeable soils. Up to the present only *Manihot, Dioscorea* and sweet potatoes have been grown. An agricultural experiment station has recently been established at Inoni. The following rotation is to be tried : soybean/groundnut/sunflower/green manure. The enterprise is still in the project stage, so that excessive optimism as to its result should be avoided. Reference is made in this connexion to the Tanganyika Groundnut Scheme, the story of which is briefly reviewed.—E.B.

South America

688 First South American Congress of Research Workers in Agronomy. This Congress, held in November, 1949, at the Uruguayan Agricultural Experiment Station, La Estanzuela, was attended by large delegations from Argentina, Brazil and Uruguay, and by representatives from Chile, Paraguay and other South American countries. The work of the Congress was arranged in five sections dealing with climate and ecology, crop and herbage husbandry, animal husbandry, processing and economics. Many of the resolutions passed at the final plenary session (the text of which is published in *Cienc. Invest. Buenos Aires*, Feb. 1950, p. 78) were concerned with economic and industrial aspects of agronomic research in South America.—G.M.R.

Argentina

689 Burlap from Linseed Straw. Fourteen factories, situated in different parts of the linseed growing regions of Santa Fé and Buenos Aires, are now engaged in the manufacture of burlap from linseed straw. A short account of this industry is given by E. A. Gruget in *Almanaque Min. Agric. Argentina* 1949, 299-305.—G.M.R.

690 Soybean Growing occupied 1650 hectares in 1946-47, 460 of which yielded a total grain harvest of 572 tons, while the remaining 1190 hectares were used as fodder, plantation cover, etc. R. Nieves, Head of the Oil Plants Division of the Argentine Ministry of Agriculture, urges an extension of the area in view of Argentina's own need of proteins and plant oils, and of the export opportunities given by the present disorganization of the normal world sources of soybeans. *Almanaque Min. Agric. Argentina* 1949. 179-82.—G.M.R.

Uruguay

691 A national agricultural plan discussed in *Rev. Asoc. Ing. Agron., Montevideo* for June, 1949, contains the following information on the areas occupied by various crops in Uruguay (in hectares): wheat, 400,000; maize, 200,000; linseed, 240,000; rice, 6500; sunflower, 100,000; groundnuts, 6500; barley, 24,000; of which 9,000 is for malting barley; oats, 70,000; lucerne, 4000; sugar beet, 1500; canary seed (*Phalaris canariensis*, mainly exported to foreign distillers) 5500; rye, 460.—G.M.R.

Colombia

692 Groundnuts. The Colombian Company for Fats, known as "COGRA" Ltd., is initiating throughout the country (but especially in the Departments of Cundinamarca, Boyacá, Tolima and Caldas) measures to promote a large-scale cultivation of groundnuts. Selected and acclimatized seed is being distributed gratuitiously together with informatory leaflets, a technical expert has been appointed in an advisory capacity, agricultural machinery, lime, insecticides, etc., are being made available for growers, transport of the crops is being arranged, and a remunerative market is guaranteed. *Agric. trop. Bogotá*, Oct. 1949.—G.M.R.

Indonesia

693 Food Resources. "Ever since the end of the war the food situation has been a source of considerable anxiety. Even to-day the available quantity of food per head of population is substantially below that of before the war. The statistical data at hand suggest that the supply of animal proteins is lower in Indonesia than anywhere else in the world." *Landbouw. Buitenzorg*, 1949, 21, 680.

In 1949 the State, in consultation with the Agricultural, Veterinary and Fishery Service, drew up a Special Development and Extension Plan for Agriculture and Fisheries. An account of this plan is given in the Indonesian periodical *Landbouw* for December, 1949. The article is in Dutch, with an informative 10-page summary in English. Rice, the country's staple food, receives much attention in the plan, and measures to be put into immediate operation include an increase in the number of regional plant selection stations and the establishment of a large number of rice seed farms. It is hoped to increase the annual output of cleaned rice by some 600,000 tons within 9 years.

It is planned also to improve the seed supply of groundnuts and soybeans so as to cover an area of 10 per cent of the total rice area, or some 200,000 hectares. It is hoped within 9 years to increase the output of shelled soybeans and groundnuts by approximately 100,000 tons. Intensified study is to be made of the animal and insect pests of rice, groundnuts and soybeans. The use of phosphates in irrigated ricefields is to be encouraged. A network of experiment farms is to study agriculture in the non-irrigable lands, in which the keeping of stock for maintaining and improving soil fertility is an important requirement.—G.M.R.

Printed by the Cambrian News (Aberystwyth), Ltd.—650/4/50.

FIELD CROP HUSBANDRY

LAND UTILIZATION AND MANAGEMENT

694 KAY, H. D. **Quality in agriculture.** *Advanc. Sci.* 1950, **7**, 259-72.

The presidential address to section M of the British Association.—N.G.S.

695 SALAMAN, R. N. **The influence of food plants on social structure.** *Advanc. Sci.* 1950, **7**, 200-11.

The address of the president of Section H, of the British Association at the annual meeting, September 1950. It deals largely with the effect of the potato upon the peasantry of Ireland.—N.G.S.

696 WEDEL, F. W. von [Ed.] Gedanken über Ziel und Weg der landwirtschaftlichen Beratungswesens. [**Object and methods of the agricultural advisory service**] 1948, pp. 31. [Published by the Central Office of Food and Agriculture in the British Zone of Germany]

697 COTTAM, H. R., BRAND, R. A., and SULLAM, V. B. **Land redistribution: one aspect of agrarian reform in Italy.** *Foreign Agric.* 1949, **13**, 219-24.

In a public statement in April, 1949, Premier Alcide De Gasperi revealed the broad lines of a proposed land distribution programme under which an estimated 3.7 million acres from large private holdings and from public lands would be made available for the creation of small holdings. The four phases recognized are (1) reform of farm tenancy contracts; (2) reform of farm labour management relations; (3) compulsory reclamation of specified undeveloped areas; and (4) limitation on size of individual holdings. The basic feature of the governmental project is the creation of a " pool" of land from which a large number of small holdings will be established. The programme will start in the reclaimed areas of Puglia and Lucania in the South, the coastal plains of Maremma, and the province of Ferrara in the Lower Po Valley.—S.D.

698 OLIVA, A. Il problema della seconda metà del secolo. [**The problem of the second half of the century.**] *Humus, Milan* 1950, **6**, No. 2, 3-5.

The author examines the possibilities of increasing agricultural production in Italy in order to meet the requirements of a population which in a few years will reach 50 millions. These requirements, in millions of quintals, are: wheat 90, maize 36, rice 7.6, beans 7, meat 8.5. The agricultural land amounts to 23 million ha., 0.8 of which is hilly. In the zones under intensive cultivation the soil has been built up through years of work from heath and moorland. The wheat return (the measure of fertility) is about 40 q. per ha. Although records of 60 to 80 q. are obtained (the theoretical yield obtainable is 110 to 120 q.) it is expected that wheat, as well as maize and forage crops, will show but little further improvement in these zones. An increase will be obtained from zones under semi-extensive agriculture now mainly devoted to the vine and olive. A greater increase, but in a longer period, is possible from zones under extensive agriculture, especially where the rainfall is above 500/600 mm. or irrigation water is available. The author concludes that agriculture in Italy has proved capable of maintaining and increasing the fertility of the soil and that a further increase of production is possible through patient work, the results of which are not to be expected in a short time.—E.B.

699 ZUCCHINI, M. Riforma agraria e bonifica. [**Agricultural reform and land reclamation.**] *Humus, Milan* 1949, **5**, No. 10, 5-7.

Agricultural reform in Italy must deal with land distribution and the problems of contracts and wages; but in the province of Ferrara it must also deal with the reclamation of land still under water. Reclamation started in the Middle Ages and was greatly developed after 1850 so that by the beginning of the first World War the arable land of the province had almost doubled. The draining of the " Valli di Comacchio," which covers an area of 32,000 ha. under stagnant water, is projected.—E.B.

700 ROSS, J. C. **Land use and soil conservation in the Union of South Africa.** *Bull. agric. Congo belge* 1949, **40**, 2123-40, bibl. 10. [Soil Conserv. and Ext., Dep. Agric.]

A general review of the subject is given with special reference to legislative and other measures which have recently been adopted to rehabilitate the farming industry and to conserve the agricultural resources of the country.—E.B.

701 RAYCHAUDHURI, S. P. **Soil conservation survey and land use classification.** *Indian Fmg* 1949, **10**, 138-43.

Land-use planning and soil conservation are becoming of increasing importance because of the increased demand for food, clothing and better amenities which is coincident with a rapidly increasing world population. This article outlines the method of tackling these two problems in the U.S.A. While the author is aware of the work already being carried out in Bombay by the Land

Improvement Section of the Department of Agriculture, he urges that this work needs to be increased in scope, co-ordinated and carried out on a scale more in keeping with the magnitude of the problem of the country as a whole.—T.D.H.

702 FARMER, B. H. **Agriculture in Ceylon.** *Geogr. Rev.* 1950, **40**, 42-66, bibl. 47, illus. 25.

The author discusses some geographical aspects of Ceylon's agriculture and describes the land, climate, irrigation, colonization and degree of land use. There are several illustrations, a relief map and charts showing annual rainfall, soil, and the main crops. Tea, rubber and coconuts are grown on the estates, whereas paddy and chena crops are mainly grown by peasants. Though chena (shifting cultivation) is officially allowed only under government licence, chena clearings are common over most of the dry zone. The crops grown include millet, maize and hill rice. The chenas are abandoned after one or two years when weeds, rather than decreasing fertility, make further cultivation unprofitable.—K.O.

703 JOACHIM, A. W. R., and KANDIAH, S. **Soil fertility studies 2. The effect of shifting (chena) cultivation and subsequent regeneration of vegetation on soil composition and structure.** *Trop. Agriculturist* 1948, **104**, 3-11.

See *Soils and Fertilizers.*

704 LADEJINSKY, W. I. **Land reform progress in Japan.** *Foreign Agric.* 1949, **13**, 38-41.

The Land Reform programme which is mainly concerned with helping tenants to become owner farmers, has been especially successful in the Prefectures of Kagawa, Okayama, Fukuoka, Saga and Kumamoto of Old Japan.—S.D.

705 OREGON Agricultural Experiment Station. Sta. Bull. 459. **Oregon's capacity to produce.** By *M. L. Upchurch.* 1948, pp. 20.

Of Oregon's total area of 61 million ac., arable land accounts for 5 million ac. and grazing for approximately 45 million ac. The remaining acres of the State constitute the stony waste lands of the high mountains, other waste areas, fir forests, water surfaces and urban areas. The maximum acreage is thus being utilized and it appears unlikely that there will be any great fluctuation as far as the respective arable and grazing acreages are concerned. Irrigation, drainage, and land clearing projects may add another 73,000 acres to the arable acreage, but the main value of these schemes lies in their improvement of existing cropland.—T.D.H.

706 TEMPANY, H. A. **Land-utilization in the wet tropics.** *Emp. J. exp. Agric.* 1949, **17**, 148-56, 2 pls.

The super-humid tropics present special problems of land-use; the heavy and continuous rainfall, high humidity and high temperature produce the typical conditions that differ markedly from those of sub-humid regions, with heavily leached soils and rapid disappearance of organic matter when drainage is unimpeded; when drainage is impeded leaching is restrained, mineral fertility is higher, and organic matter accumulates; the soils are heavier and in their natural condition often unusable, but when reclaimed by drainage they may be of great value and have a wider range of uses than upland soils.

On uplands, permanent orchard crops are the most suitable form of cultivation as they permit the nearest approximation to natural conditions although limited possibilities in other directions exist. In alluvial lowland areas, although orchard crops may grow well, annual crops can be grown; in particular rice is well suited to such conditions, other annual crops can also be grown, and there is some scope for animal husbandry. On this account these regions are specially important from the point of view of food supply.

Correct land-use is essential in view of growing populations and demands for food, and on this account the limitations imposed on land-use as a consequence of conditions must be recognized.—Author's summary and conclusion.

707 AUSTRALIA, University of Western Australia, Geographical Laboratory, Res. Rep. No. 13. **The geography of the Fitzroy river valley, W.A.** By *L. Johnson*, 1950, pp. 20. [Mimeographed] [Geog. Lab., Univ. West Aust., Nedlands, Australia]

708 HENDERSON, K. V. **Agriculture in the Upper Burnett.** *Qd agric. J.* 1949, **69**, 311-23.

This illustrated article gives a detailed description of the climate, soils, vegetation, agricultural and horticultural crops, dairy industry and forestry of the area. The main cereals grown are grain sorghum and maize. Fodder crops are Sudan grass (*Sorghum sudanense*), saccharine sorghums, and millets. For winter grazing wheat and oats are grown. Cotton is successful, the popular varieties being Miller, Triumph, New Mexico and Acala.—K.O.

FARMING SYSTEMS

709 RUBIN, A. Über die Weiterführung des Ackerbaues in Berglagen. [**The further development of arable cultivation in mountain situations.**] *Alpw. Mbl.* 1949, **84**, 136-42. [Alpschule, Brienz, Switzerland]

An account is given of the development of arable cultivation in the mountains of Switzerland from 1914 onwards. Regarding the economic aspect, it is shown that arable cultivation has had a favourable, rather than unfavourable, effect on the number of cattle maintained on mountain holdings. See also abs. 710.—D.B.

710 RUBIN, A. Über die Weiterführung des Ackerbaues in Berglagen. [**The further development of arable cultivation in mountain locations.**] *Alpw. Mbl.* 1950, **84**, 197-208. [Alpschule, Brienz, Switzerland]

This second paper discusses the following aspects of the problem: the possibilities, limitations and difficulties involved in this type of cultivation; the government subsidies, loans and other measures for its promotion; the cultivation of fodder cereals; and, in conclusion, the general problems of self-sufficiency and the social aspect of problems which face mountain populations. See also abs. 709.—D.B.

711 PORTÈRES, R. L'assolement dans les terres à arachides du Sénégal. [**Crop rotation on groundnut soils in Senegal.**] *Rev. Bot. appl.* 1950, **30**, 44-50.

In the search for a suitable crop rotation it is advisable to study first the rotations practised in primitive agriculture. In the province of Cayor the rotations are: (a) groundnuts/groundnuts/early millet (*Panicum miliare* ?)/late millet and 1 to 3 years fallow, or (b) groundnuts/early millet +*Vigna sinensis*/groundnuts/late millet, the rotation repeated three times after which there is a fallow of 3 years. Groundnut being a cleaning crop justifies its being placed at the beginning of the rotation. In the north of Cayor (region of Louga) where the soil is sandy and the climate drier, the rotation is: early millet or early sorghum/early groundnuts, this rotation is repeated, then a fallow of variable duration follows. The difficulty of cultivation in this region makes it advisable to give the best conditions to the food crop. In the Upper Saloum and Upper Gambia (South Senegal) where rainfall is relatively high, the rotation groundnuts/late millet or late sorghum is repeated as many as 3 times, before fallowing. The rotation early millet + *Vigna*/groundnuts/fallow with green manure is under trial in Senegal. *Vigna* is sown at the end of of August or beginning of September in the millet; after the grain harvest the millet stems are left on the soil. This practice ensures soil protection in the first year. Such a rotation bears resemblance to that used in dry regions. The author points out that suitable rotations should be chosen for the various regions with regard to succession, variety, intercropping, etc.—E.B.

712 JINENDRADASA, P. T. **Rotational farming scheme, Kurundankulama, North-Central Province.** *Trop. Agriculturist* 1948, **104**, 27-37, bibl. 3, append. 3.

The article describes results of a dry farming experiment which was started in 1938 on an unirrigable area of 100 acres at Kurundankulama. The experiment was to determine: (a) the area of unirrigable land in the dry zone which an average peasant family could farm efficiently using simple, bullock-drawn implements; (b) the income to be derived; and (c) whether soil fertility could be maintained over long periods under the prevailing conditions of intense rainfall during the short rainy season, and long spells of drought and high temperatures.—K.O.

713 CANADA, Department of Agriculture. Pub. 825. Fmrs' Bull. 157. **Types of farming in Canada.** By *S. C. Hudson*, and others. 1949, pp. 83. 1 map.

The information in the bulletin is derived from the 1941 Census and is summarized under the following heads. (1) The relation of the physical and economic factors to the geographical distribution of the types of farming found in Canada. (2) The production of the principal agricultural crops and live stock, with a map showing the distribution and concentration of each type of product. (3) The geographical distribution of farm types. (4) Types of farming according to regions. An appendix contains three tables giving the following information: percentage utilization (according to enterprise) of occupied farm land; percentage distribution of types of farm according to type-of-farming areas; distribution of farm income according to type-of-farming areas. A folding map of Canada shows 198 type-of-farming areas with their type of farming divided according to product and organization (commercial, self sufficing, etc.)—P.J.B.

714 UNITED STATES, Department of Agriculture. Misc. Publ. No. 707. **Changes in American farming.** By *S. E. Johnson.* 1949, pp. 75.

This publication is of great interest as a survey of the progress of American agriculture from 1910 to the present day. It is divided under the following heads: 1. significance of recent changes, 2. foundation for increased production, 3. implications of recent and prospective changes. The subheadings under 2. entitled changes in land use, conservation, fertilizer practices and change in crops are of particular interest. There are 38 maps and graphs and 12 tables.—P.J.B.

CONSERVATION PRACTICES

715 TKATCHENKO, B. Défense contre la sécheresse et contre l'érosion dans les steppes de la Russie méridionale. [**Control of drought and erosion in the steppes of southern Russia.**] *Agron. trop.* 1950, **5**, 3-41, bibl. 54.

There is analogy between this region and many

French subtropical overseas territories. Annual rainfall varies from 200 to 500 mm. Intensive cultivation of cereals, sugar beet, sunflower, cotton, *Ricinus* and groundnut, is carried on, but yield is periodically depressed by drought. The article, which is abundantly illustrated, deals with the following points: causes which have increased the effects of drought; measures adopted before and after the 1917 revolution; forest belts and their influence on water-table, wind, soil, and crop yield; method of planting; sand fixation; cultural methods; and irrigation.—E.B.

716 DU BOIS, H., and LECOMTE, M. Note sur la conservation des sols et la régénération forestière à la station et dans le paysannat de Bambesa. [**Note on soil conservation and forest regeneration at the station and in the country of Bambesa.**] *Bull. agric. Congo belge* 1949, **40**, 2456-67, bibl. in text. [I.N.E.A.C. Station, Bambesa, Uele, Belgian Congo.]

The farming programme being carried out in the Babua region includes the establishment of strip cultivation, orientated east and west, separated by strips of forest. Two years' cultivation is followed by 16 years of fallow under forest. The first part of the fallow consists of grasses; with *Paspalum* predominating in the first year. Fallow under legumes was unsuccessful. Fallow under *Pennisetum purpureum* has so far proved satisfactory, especially if the grass is cut every year. Cotton yields after 3 years' *Pennisetum* fallow are reported. The effect of mulching on cotton and maize is examined. It can increase cotton yields by as much as 50 per cent. Trials are being carried out to find the best length of cultivation period and its effect on crop yield.—E.B.

717 PENDLETON, R. L. **Agricultural and forestry potentialities of the tropics.** *Agron. J.* 1950, **42**, 115-23, bibl. 27. [Amer. Soc. Agron., Milwaukee, Wisconsin, U.S.A.]

The soils of humid equatorial regions have distressingly limited possibilities for plant production. Removal of the forest cover leads to the rapid exhaustion of such soils. For the production of upland grain and fibre crops, an 8 to 15 year forest fallow is advocated. Cogon grass (*Imperata cylindrica*) and fire often prevent the regeneration of this fallow. Phosphorus is one of the limiting factors in plant and animal growth on such soils. Where the soil can be kept at least slightly submerged during the growing season, crops of pady [lowland rice] can be grown annually, or oftener, even on soils very low in plant nutrients.—P.J.B.

718 WAKEFIELD, L. L. **Contour strip cropping.** *Northw. Sci.* 1949, **23**, 87-90. [Soil Conservation Service, Lewiston, Idaho.]

The contour-strip cropping method of erosion control has proved economical and efficient in the Northwest. Its disadvantages when fencing for rotational cropping are outweighed by the conservation of soil, moisture and fertility achieved.—E.B.H.

719 MOODY, A. B. **Maintaining the fertility of our farm lands.** *J. Dep. Agric. S. Aust.* 1949, **53**, 131-4.

ECONOMICS OF CROP PRODUCTION

720 ORWIN, C. S. **Farm economics.** *J. R. agric. Soc.* 1948, **109**, 34-41, bibl. 56. [Blewbury, Berks.]

Recommendations of the Food and Agriculture Organization of the United Nations for the year 1947-48 are outlined and mention is made of the Conference of Agricultural Economics at Dartington Hall where the position of the small farmers was discussed. The work of the National Farm Survey is reviewed, with emphasis upon farming standards, the distribution of capital, the composition of costs, and farm productivity.—S.D.

721 CAMBRIDGE UNIVERSITY, Department of Agriculture. Farm Econ. Branch. Rep. No. 39. **A survey of the cost of producing wheat in three districts in the Eastern Counties, 1948.** 1949. [Mimeographed]

Since the war, the Eastern Counties Province has reduced its wheat production so that by 1947 it was below the pre-war level. Despite a small increase in 1948, it has not regained its pre-war predominance. The farms recorded were on the heavy clay of West Cambridge and North Essex, and on the light, sandy loam of East Suffolk. The first two districts are suitable for wheat but in East Suffolk the crop is unreliable so that barley and sugar beet are the principal crops. Wheat was usually sown following temporary leys, but was sometimes preceded by barley, potatoes, or a pulse crop. Total costs averaged some £15 per acre. Pre-harvesting costs were heavier in the East Suffolk district due to the greater use of farmyard manure, but harvesting costs were comparatively low. The average requirement of manual labour was 35.5 hours per acre. Yields were better than usual in all districts, averaging 4 to 5 quarters an acre, and gave an average profit of between £8 and £11 per acre. There was, however, a wide range in yields from under 2 quarters to nearly 9 quarters of head corn per acre so that financial results on individual farms ranged from a loss of £5 to a profit of £25 an acre. —A.D.H.

722 AFRICA, Colony and Protectorate of Sierra Leone. **A plan of economic development for Sierra Leone.** 1949, pp. 56.

The purpose of this report is to indicate measures and requirements necessary to achieve a substantial increase in economic production during the next 4 or 5 years. Economic progress depends upon further mineral expansion, upon the oil-palm industry and upon the developing of large-scale swamp cultivation of rice for export. Particular attention is drawn to co-operative organization, the most promising means by which African producers can take a more active part in the commercial life of the territory. The economy of the territory is one of small peasant farmers, and about two-thirds of the national income is derived from agriculture, forestry and pasturage. The Agricultural Department has for many years concentrated on the cultivation of food crops, particularly rice, while the upland areas have been reserved for cocoa, coffee, and fruit.—S.D.

723 CANADA Department of Agriculture. Publ. 750. Fmrs' Bull. 118. **Cost of operating farm machinery (eastern Canada).** By *W. Kalbfleisch.* 1950, pp. 36.

724 OREGON Agricultural Experiment Station. Sta. Bul. 465. **Cost of producing sweet corn in the Willamette Valley, Oregon.** By *G. B. Davis* and *D. C. Mumford.* 1949, pp. 23.

CROPS IN GENERAL

Agronomy

725 SCARRONE, F. Les productions végétales en pays bamiléké au Cameroun Français. [**Plant production in the "bamiléké" country of the French Cameroons.**] *Rev. Bot. appl.* 1950, **30**. 158-67, bibl. 4.

Information is given on the crops of this region, which include groundnuts, maize, rice, kidney-beans, *Colocasia antiquorum*, *Xanthosoma sagittifolia*, and Cassava. The possibility of introducing new plants is examined. Soybeans give two crops per year, but are not appreciated by the natives.—E.B.

726 LASTOVKA, E. V. [**Mixed sowings of field crops.**] [Russian] *Sovet Agron.* 1950, **8**, No. 3, 64-70.

In the Baltic republics, Tartary, Kuban and Armenia, field crops consisting of mixtures of different cereals are frequently met with. In Georgia and Moldavia maize mixtures are general. In Moldavia much of the maize is grown in mixture with potatoes, pumpkins, soya and beans. In the Central Asia republics, the Far East, and the Ukraine various field crops are also cultivated in mixed sowings.

Experiments and practice indicate that mixed sowings, compared with pure sowings, give larger yields per unit of area and that these sowings are characterised by greater stability. With mixed sowings the available area is more fully utilized.—R.P.J.

727 NORTH CAROLINA Agricultural Experiment Station. Bull. 364. **Measured crop performance.** By *H. L. Cooke* and *R. P. Moore.* 1949, pp. 49.

The results of the 1948 tests conducted by the North Carolina Crop Improvement Association are presented. The tests include corn, wheat, oats, barley and cotton. In addition to the tables giving yield and other data some recommended varieties are described.—R.N.H.W.

Varieties

728 CAFFREY, M. **Breeding for disease resistance.** *J. Dep. Agric., Éire* 1948, **45**, 38-44. [Plant Breed. Dept., Univ. Coll., Dublin]

In addition to examples from the clovers and grasses, the author reports the occurrence of individual swede plants resistant to "finger and toe" disease and their selection as mother plants in breeding new swede varieties. He deals in more detail with the production of new wheat varieties resistant to black stem rust (*Puccinia graminis*). After outlining the life history of the rust and the destruction of the alternative host plant (*Berberis vulgaris*) as a control measure, reference is made to two new varieties, Hope and Thatcher, derived from crosses between *Triticum durum* and other wheat species. Thatcher has been proved superior to Marquis in North America in yield and quality but recent reports show that a new biologic form of the stem rust is capable of attacking this new wheat. This complication constantly arises in breeding for disease resistance. In a somewhat similar way new forms of a parasite are found to arise which no longer succumb to treatment by chemical attack fatal to the original parasite. The author concludes that mixtures of different strains of crop plants would not in practice lead to more healthy crops.—J.L.

729 HORNE, F. R. **The possibilities of increased crop production by the better utilisation of existing varieties and the introduction of new varieties.** *Agric. Progr.* 1948, **23**, 91-4. [Nat. Inst. Agric. Bot.]

Increases in food production are most readily obtained from crops by the removal of factors which limit yields. Instances are the development of resistance in wheat to yellow rust; resistance to mildew in oats; resistance to blight and field immunity to virus diseases in potatoes; resistance to shattering of ears and to sprouting of grain in wheat and other cereals. Resistance to lodging in cereal varieties is of special importance because it permits the fullest use to be made of fertilizer treatments so that the potential yielding capacity of the variety can be fully expressed. This is particularly true in varieties intended for the more fertile soils.

On poorer classes of soil where the law of diminishing returns may operate to prevent adequate financial returns being obtained from higher dressings of fertilizers, it may be desirable to use varieties which give consistent though lower yields. The success of Little Joss on light soil and Squarehead's Master on medium soils may be instanced. Even under such conditions improvements in yield can often be obtained by using related hybrids or selections. The direct increase of productivity as distinct from the removal of limiting factors is more difficult but has been achieved in the newer varieties of winter oats, many of the French types of wheat, and in "high dry matter" strains of mangold and fodder beet.—From author's summary.

Seeds

730 ÉIRE, Journal of the Department of Agriculture. **Report of the Seed Propagation Division, 1947.** *J. Dep. Agric., Éire* 1948, **45**, 88-104.
This report deals in some detail with pedigree cereal seed production and variety testing, from the foundation plants to field-scale production under contract. The crops dealt with are barley, oats, wheat, and linseed.—N.G.S.

731 NANDA, K. K. **Catalase ratio as a rapid method for determining the germinating capacity of seeds.** *Curr. Sci.* 1950, **19**, 22-4, bibl. 4. [Dept. Bot., Univ. Delhi]
The experiment made use of the close parallelism between the catalase ratio and germinating capacity of seeds as a means for rapidly determining their viability. Graded seeds of *Zea mays*, var. Jaunpur Yellow, *Triticum vulgare*, var. I.P. 52, *Phaseolus vulgaris*, var. Banaras Local, and *Carthamus tinctorius* var. Banaras Local, were used in the experiment. The results showed that a higher value in the catalase ratio in all the seeds tested was accompanied by a higher percentage germination, and vice versa.—K.O.

732 ROACH, W. A. **Good crops from poor land. Treatment of seed instead of soil.** *Trop. Agriculturist* 1948, **104**, 215-7. [East Malling Res. Sta.]
Though circumstances made it impossible to carry out the experiments to full scale field trials, experiments indicated that soaking seed in $MnSO_4$ before sowing in Mn-deficient soil resulted in the seedlings remaining green and healthy some weeks after those from untreated seed had died. The results of this experiment indicated that on mineral deficient soils seed soaking may carry the seedling through this early critical stage until there is enough leaf development for Mn sprayings to be effective. There are certain conditions that have been found essential for success, and a warning is given that unless these conditions are satisfied, the grain may easily be damaged or killed.—K.O.

733 AUSTRALIA, Council for Scientific and Industrial Research. Bull. No. 237. **Heating in stored wheat. 1. Respiration of dry grain, insect respiration, and temperature and moisture effects.** By *Joan Milthorpe* and *R. N. Robertson.* **2. Heat production, heat conductivity, and temperature rise in grain in the presence and absence of insects.** By *R. N. Robertson.* **3. Two years' temperature records of dry grain in a concrete silo.** By *R. N. Robertson* and *Joan Milthorpe.* 1948, pp. 35. [Botany School, Sydney Univ.]

Maintenance of fertility

734 CROWTHER, E. M. **Soils and fertilizers.** *J. R. agric. Soc.* 1948, **109**, 71-81, bibl. 19. [Rothamsted Exp. Sta., Harpenden, Herts.]
Plant relationships of saline and alkali soils in connexion with reclamation, cultural practices and species tolerance are reviewed.—S.D.

735 FRECKMANN. Über den Vorfruchtwert der wichtigsten Kulturpflanzen. [**The value of the most important crops as preceding crops in a rotation.**] *Z. PflErnähr. Düng.* 1949, **45**, 263-7. [Detmold, Germany]
The value to the soil of the stubble and roots of several forage crops and cereals is explained.—D.B.

736 SALOHEIMO, L. Proteini-aineiden vaihtelusta vaaramorenilla ja mutasuoturpeella kasvaneessa viljassa. [**Variation in protein in cereals grown on vaara-moraine and low moor.**] *Maataloust. Aikakausk.* 1949, **21**, 109-15, [German summary, p. 115.]
In the low moor cultivations of Finland the soil layer from which plant roots derive nutriment contains three to four times as much nitrogen, fixed in the peat, as mineral soils. The nutrient absorption of plants is discussed based on experiments which were conducted at the Karelia Moor Cultivation Experiment Station. The investigation relates to summer wheat, oats and barley grown in vaara-moraine and on low moor. Nitrogen determinations were made on the yields in the years 1943, 1946 and 1947, also on oats in an experiment set up in 1947 on high moor. The results indicate that the plants growing on nitrogen-rich humus peat soil accumulate proportionately more nitrogenous matter than those on vaara-moraine. In the cases investigated this difference in the relative amount of protein in

the cereal grains varied between 19 and 64 per cent. The proportion between crude and pure protein remained the same in both kinds of soil so that the nitrogenous matter appears to be equivalent in both cases. Summer wheat was an exception to the other experiments in the experimental year 1947. Then night frost interrupted the ripening of the wheat growing on low moor and as a result this contained somewhat less N-rich matter than the wheat grown on the vaara-moraine. [From German summary].—R.P.J.

737 EAST AFRICAN AGRICULTURAL JOURNAL. **Report on discussion on fertilizer experiments in East Africa.** *E. Afr. agric. J.* 1949, **15**, 61-8.

This article reviews papers submitted at a meeting at Nairobi in July, 1949. The papers include (1) Fertilizer studies on Uganda soils, by H. L. Manning and G. ap Griffith; (2) Summary of manurial experiments in Zanzibar, 1933-1948, by A. K. Briant; (3) Fertilizer, manure, and cultivation effects at Ukiriguru, by J. E. Peat; (4) Soil fertility studies and fertilizer policy, and Soil fertility and fertilizer studies (extracts from the 1948 report of the Scientific Department, Overseas Food Corporation, Kongwa), by A. H. Bunting and Mrs. I. Matheson; (5) Highland fertilizer scheme: Provisional summary of 1948-1949 results, by R. V. Holme and E. G. P. Sherwood; (6) Report on fertilizer experiments, 1947-1948, by L. R. Doughty and D. W. Gourlay; (7) Phosphate trials in East Africa, by P. Robinson; (8) Results of mineral fertilizer trials, in the Belgian Congo, by A. Focan; (9) Certain work on the availability of phosphatic fertilizers and the effects of different methods of placing triplesupers and soda phosphate on phosphate uptake by wheat, by G. H. Gethin Jones.—S.D.

738 MANNING, H. L., and ap GRIFFITH, G. **Fertilizer studies on Uganda soils.** *E. Afr. agric. J.* 1949, **15**, 87-97.

Fertilizer trials conducted in Uganda during the past 3 years are reported. Modern experimental designs have been used for most of the tests and the results may therefore be statistically analysed. Yield responses have been reported for a number of crops including finger millet, maize, sweet potatoes, sugar cane, groundnuts, sorghum and cotton. Of all the fertilizers tried, only nitrogen led to appreciable yield increases, showing that the mere application of artificial fertilizers does not provide a substitute for inefficient cultural practices.—From authors' discussion.

739 FOTIDAR, M. R. **Lentil as green manure.** *Indian Fmg* 1949, **10**, 111-2. [Dept Agric., Jammu and Kashmir State, Srinagar]

Green manuring with *Lens esculenta* is an inexpensive practice which considerably benefits the soil and increases the yield of rice. 5 years of experiments were conducted to compare the fertilizing effects of lentils with farmyard manure, ammonium sulphate, gypsum and mixtures of these fertilizers. Green manuring with lentils gave the highest yield gains of rice. Instructions are given for: sowing the lentils (in October, about a fortnight after the rice harvest), subsequent cultivation, harvesting and turning under the soil.—M.E.E.

740 MAINE Agricultural Experiment Station. Bull. 474. **Green manure crops and rotations for Maine potato soils.** By *G. L. Terman.* 1949, pp. 40, bibl. 8.

The experiments were carried out over the years 1931 to 1948 to compare cropping practices suitable for potato production. Among the green manure crops tested were Japanese millet, field corn, oats, Sudan grass, ryegrass, sunflowers, crimson clover, soybean, vetch, mammoth and medium red clover and alsike. Japanese millet was usually the most satisfactory non-legume for use in short potato rotations. Annual legume green manures were usually low in yield and increased the weed problem. Mammoth red, medium red or alsike clover either alone or in grass mixtures were the most satisfactory legumes for seeding in small grains in a 3-year or longer rotation.—P.J.B.

Weeds and their control

741 BLACKMAN, G. E., and HOLLY, K. **The control of hoary pepperwort.** *J. Minist. Agric.* 1949, **56**, 6-11. [Dept. Agric., Univ. Oxford]

Over considerable areas of heavy clay, particularly in south-east England, *Cardaria* (*Lepidium*) *draba* is a troublesome weed on winter wheat and bean land. The cropping system must be planned so that two autumn-sown cereals are grown on infested fields in successive years, followed in the 3rd year by, perhaps, a spring sown crop which will also be resistant to either MCPA (2 methyl-4-chlorophenoxyacetic acid) or DCPA (2 : 4 dichlorophenoxyacetic acid). If MCPA is used, the pepperwort should be sprayed in the spring when the flowerbuds are forming, at a concentration 2 lb. in 100 gallons per acre, whereas with DCPA spraying at 0.2 per cent should not take place until the pepperwort is in flower. For complete eradication two successive yearly sprayings are necessary.—S.D.

742 JOURNAL OF THE DEPARTMENT OF AGRICULTURE, ÉIRE. **Trials with agroxone for weed control.** *J. Dep. Agric., Éire* 1948, **45**, 80-3.

Trials in 1946 and 1947 showed that 1 per cent agroxone spray at 100 gallons per acre gives effective control of most cruciferous weeds (charlock, wild turnip) and that it causes less damage to the cereal crop, is more convenient in use and is less affected by rainfall than 3 per cent copper sulphate solution. Fair control of other weeds can also be obtained, though up to 4 per cent agroxone may be needed for this. Cleavers (*Galium aparine*) and corn marigold (*Chrysanthemum segetum*) were very resistant to the spray. The underground parts of perennial weeds were only partially killed. Crop plants, except cereals and grasses, are liable to be killed by agroxone.—J.L.

743 GYSEL, A. Der Stand der Unkrautbekämpfung im schweizerischen Ackerbau. [**The position as regards weed control in arable cultivation in Switzerland.**] *Schweiz. landw. Mh.* 1949, **27**, pp. 15, bibl. 29. [Eidg. agrikchem. Anst., Liebefeld-Bern]

The chemical agents of control and the principles underlying control by cultivation were the subject of paper before the Society of Swiss Agriculturists. —D.B.

744 LACROIX, L. Influence de certains produits désherbants sur la végétation de l'avoine et du lin. [**Effect of some herbicides on oats and flax.**] *Rev. agric.* 1949, **2**, pp. 15.

The account is concerned with effects of commercial preparations of growth regulating substances on these crops; the effect on the weeds is here only a secondary consideration.—D.B.

745 ÅBERG, E. **Effect of hormone derivatives on weeds and cultivated plants.** *Kungl. Lantbrukshögsk. Ann.* 1949, **16**, 695-708. [Plant Husbandry Inst., Royal Agric. Coll., Uppsala]

The paper is principally a review of the developments in research work on hormone derivatives in Sweden between 1946 and 1948 and a summary of the problems awaiting future study. The effects of chloroxone and methoxone on weeds and cultivated crops are compared. Results suggest the possibility of specialized hormone derivatives for use on specific crops. The relation between hormone damage and stage of growth were studied in weeds and crops. Cereals showed a susceptibility over a period between 2 and 3 weeks after emergence. Tabulated data show that methoxone has a less detrimental effect on yield than chloroxone, particularly in the case of sensitive crops such as peas, beans and flax.—P.J.B.

746 HAGSAND, E. Hormonderivat mot dån och spergel. [**Hormone derivatives to control *Galeopsis* spp. and *Spergula arvensis*.**] *Lantm. Svenskt Land* 1950, **34**, 196-7. [Inst. Crop Husb. Agric. Coll., Sweden]

A hormone derivative of the 4K-2M type should be used. To control *Galeopsis* in cereal crops, spraying should be carried out at the rate of 8 to 10 litres per ha. when the *Galeopsis* plants have developed four to six leaves. In an autumn-sown cereal crop, where *Galeopsis* is the predominant weed, spraying should take place in the spring.—R.P.J.

747 JÄGERSTÅHL, G. Försök med dinitrobutylfenol som ogräsbekämpningsmedel. [**Experiments with dinitro-sec,-butylphenol in weed control work.**] *Växtodling* 1949, **4**, 39-48. [English summary, p. 48.]

The species sprayed were *Stellaria media* and *Fumaria officinalis* which were growing in a crop of yellow peas; *Polygonum tomentosum*, *P. convolvulus*, *Chenopodium album*, *Fumaria officinalis*, *Sinapis arvensis*, *Erysimum cheiranthoides*, *Galeopsis* spp., *Stellaria media*, *Spergula arvensis*, and *Tussilago farfara* growing in mixed cereal crops were slightly resistant, but *Cirsium arvense* and *Sonchus arvensis* were adversely affected. Lucerne was slightly damaged by spraying; yellow and blue sweet lupins were very sensitive to spraying.—S.D.

748 OSVALD, H. Ogräsforskningen under år 1948 vid Institutionen för växtodlingslära. [**Weed control research in 1948 at the Institute of Plant Husbandry.**] *Växtodling* 1949, **4**, 5-7. [English summary p. 7.]

Different hormone derivatives and their effect on plants are discussed. A number of new preparations recently brought on to the Swedish market have been tested and compared with some chemical compounds of other types such as copper salt, dinitro-orthocresols and calcium cyanamide. In some experiments, dinitro-sec-butylphenol and isopropylphenyl carbamate have also been tested.—S.D.

749 THOMAS, K. M., and SRINIVASAN, A. R. **Weed killers.** *Indian Fmg* 1949, **10**, 101-6. [School of Mycol., Coimbatore]

General methods of weed control are discussed and the actions of non-selective and selective weed-killers are described in some detail. The special features of hormone weed-killers are outlined and results of trials with a form of MCPA on twenty-four susceptible, four intermediate, and eleven resistant weeds are presented. A number of crops, including cereals, were also tested at Coimbatore for their susceptibility to MCPA solutions of varying strengths.—M.E.E.

750 MCROSTIE, G. P. **The losses from weeds.** *Agric. Inst. Rev.* 1949, **4**, 87-90. [Ontario Agric. Coll., Guelph]

The article deals with the cost of summer fallow and cultivation, losses through competition with weeds in the growing crop, cost of harvesting and hauling weeds, loss of grade in harvested grain because of weeds, and miscellaneous losses due to insects harboured on weeds, diseases spread by insects, cost of machinery for weed control, cattle poisoning and depreciated land values. The loss in Canada alone, from the items discussed, amounts to almost 200 million dollars.—S.D.

751 FRIESEN, H. A., MACKAY, J. W. **Weeds of grain fields.** *Agric. Inst. Rev.* 1949, **4**, 91-4, bibl. 4. [Domn. Expt. Sta., Scott, Saskatchewan, (H.A.F.) and Domn. Dept. Agric., Ottawa, Ont. (J.W.M.)]

The weeds of grain fields of western Canada are described. Wild oat (*Avena fatua*) is most prevalent, and secondary to this is *Thlaspi arvense.* Weeds occurring in grain crops in eastern Canada are listed.—S.D.

752 RIPLEY, P. O. **Regional weed problems.** *Agric. Inst. Rev.* 1949, **4**, 79-86. [Cent. Expt. Farm, Ottawa]

Specialists in Canada have made observations regarding particular weeds which are troublesome in crops. This evaluation is presented on the basis of four main regions, arranged in order from east to west. The different species of weeds found in grain crops, hay and pastures, gardens and lawns, and roadsides, for the four regions of the Prairie provinces, Quebec and Ontario, Saskatchewan, and the Maritime provinces are described. The special problems which have to be dealt with are discussed.—S.D.

753 ROBINSON, R. G. **Annual weeds, their viable seed population in the soil, and their effect on yields of oats, wheat, and flax.** *Agron. J.* 1949, **41**, 513-8, bibl. 12. [Univ. Minnesota, St. Paul, Minn.]

Two methods of determining the population of viable weed seeds in the top soil to a depth of 6 in. were tried, neither being altogether successful. Trials over 3 years gave no conclusive results. Thus in 1945 there were no significant differences between the yields of weed-free and weed-infested crops. Yields of harvests on 9 consecutive days indicated that weed-free flax matured later than weed-infested flax. It was also observed that there was more soil moisture on the plots with weeds than on those without.—N.G.S.

754 STANIFORTH, D. W., and LOOMIS, W. E. **Surface action in 2,4-D sprays.** *Science* 1949, **109**, 628-9, bibl. 4. [Bot. Dept. Iowa State Coll., Ames]

Following reports of the increased toxicity of 2,4-dichlorophenoxyacetic acid when used with certain commercial wetting agents, samples of commercial soapless powders, with a base of sodium lauryl sulphate, were incorporated at a concentration of 0.5 per cent in 2,4-D sprays. As a result crop yields were seriously reduced where heavy rates of the sodium or amine salt of 2,4-D were applied. The results are tabulated. The toxicity of the ester of 2,4-D to flax was not increased by the wetting agent, though it increased the damage to maize. The yield of maize was significantly reduced by spraying with the sodium salt of 2,4-D plus 0.5 per cent concentrations of a number of commercial wetting agents. Soybean plants were killed when sprayed with a 500 ppm solution of the sodium salt of 2,4-D plus 0.5 per cent of wetting agent. The main effect of the wetting agents appeared to be that they decreased the selectivity of the 2,4-D sprays. —P.J.B.

755 IOWA Agricultural Experiment Station. Bull. P101. **Seeds of Iowa noxious weeds.** By *D. Isely*. 1949, pp. 429-454.

An illustrated description of the seeds of primary and secondary noxious weeds of Iowa.—P.J.B.

756 CURRIER, H. B., and CRAFTS, A. S. **Maleic hydrazide, a selective herbicide.** *Science* 1950, **111**, 152-3, bibl. 1. [Div. Bot. Coll. Agric., Univ. California, Davis]

Experiments with the diethanolamine salt of maleic hydrazine on barley and cotton showed that it may have valuable selective herbicidal qualities. Two-week-old barley (var. Sacramento) and 5-week-old upland cotton (var. Acala), grown in cans, were sprayed to run off with a 2 per cent aqueous solution of maleic hydrazine. In some cases 0.24 per cent of Vatsol, a spreader, was added. The spray immediately stopped growth in the barley and in 6 weeks it was dead. The cotton was unaffected. The addition of the spreader hastened the death of the barley, but had no effect on the cotton. Later tests with various plants confirmed the selective qualities of the herbicide. A critical factor was the age of the plants. Cotton sprayed at the cotyledon stage was severely inhibited, but at 16 in. high it showed no response. Young plants of the grasses *Echinochloa crus-galli* and *Holcus halepensis* when treated ceased growth and died, but older plants, though they reacted, survived. Cotton can normally be kept relatively free of weeds until laid by, but subsequent growth of weeds leads to grassy cotton at harvest time. The new herbicide may offer a solution to this problem.—P.J.B.

757 NORTON, R. A., JOHNSON, V. H., and LARSON, R. E. **A regional programme for testing weed-control equipment.** *Agric. Engng, St. Joseph, Mich.*, 1949, **30**, 528-30, bibl. 4.

Equipment problems in regard to weed-control in field corn, sweet corn and soybeans are discussed. Field and laboratory studies are described.—S.D.

Machinery and Equipment

758 WRIGHT, S. J. **Farm implements and machinery.** *J. R. agric. Soc.* 1948, **109**, 58-69, bibl. 52. [The Croft, Great Warley, Essex]

The article reviews publications on the following subjects :—general farm mechanization ; tractors ; deep tillage and cultivation ; grain harvesting, drying and storage ; and row crop mechanization.—S.D.

759 LILLEY, S. **From sickle to combine. A sketch history of agricultural machinery.** *Farming* 1949, **4**, 19-22.

760 HUBBARD, W. A. **Oil firing for grain drying, hop drying and malting.** [Paper delivered at] Joint Conference of Institute of Petroleum and Institute of Fuel. 1948, pp. 31.

A general description is given of drying plant most commonly used, the types of oil-firing equipment which have proved the most suitable for application to these driers, and the methods of automatic control generally adopted.—M.L.Y.

761 SEGLER, G. **Pneumatic grain conveyor.** *Fm Mech.* 1949, **3**, No. 16, 4-6.

The increased use of combine harvesters has created new problems in handling and storage. A review is given of methods of pneumatic conveyance in conjunction with storage, drying and ventilating systems. A grain blower developed by the National Institute of Agricultural Engineering is described which has a centrifugal fan and injector feeder. Details of other simple layouts suitable for new storage silos, and for existing buildings are also given. In each case it is evident that pneumatic conveying is both practical and valuable on the farm and facilitates bulk handling of grain.—M.L.Y.

762 JURIEN de la GRAVIÈRE, B. Ou en est la mécanisation de la culture cotonnière aux U.S.A. [**Mechanization of cotton cultivation in U.S.A.**] *Cot. Fib. trop.* 1949, **4**, 94-101, figs. 17.

The machines employed in the U.S.A. for the various cultural operations are briefly reviewed.—E.B.

763 AGRICULTURAL ENGINEERING, St. Joseph, Michigan. **Cotton production mechanized—a symposium.** By *J. C. Ferguson*, and others. *Agric. Engng, St. Joseph, Mich.* 1949, **30**, 484-98.

This issue is dedicated almost entirely to the following papers presented on a special cotton mechanization programme sponsored jointly by the Southeast and Southwest Sections and the Power and Machinery Division of the American Society of Agricultural Engineers at Baton Rouge, La., in February, 1949 :—Cotton mechanization and field studies, by J. C. Ferguson. Stalk disposal and land preparation for cotton, by H. P. Smith. Planting cotton to a stand, by H. F. Miller, Jr. Thinning cotton to a stand with flame, by T. L. Baggette. Cultivation for weed control in cotton, by L. E. Creasy and L. E. Cowart. Cultivation for weed control of cotton, by E. N. Scarborough. Harvesting cotton with strippers, by M. W. Roscoe. Cotton harvesting with the spindle picker, by M. R. Powers. Cleaning manually and mechanically harvested cottons, by V. L. Stedronsky. Engineering management aspects of mechanical cotton harvesting in the southwest, by W. J. Oates and R. H. Witt.

A paper on the development of a farm crop drier by J. W. Weaver, Jr., N. C. Teter, and S. H. Ursy is also presented.—E.B.H.

764 FREY, K. J., and BROWN, H. M. **A two row nursery harvester.** *Agron. J.* 1950, **42**, 109, bibl. 1. [Farm Crops Dept., Michigan State Coll., East Lansing]

A description of an attachment to the Jari mower for cutting rod-row plots.—P.J.B.

765 SHAW, W. C. **An efficient sprayer for application of chemical sprays to experimental field plots.** *Agron. J.* 1950, **42**, 158-60. [Dept Agron. Ohio State Univ., Columbus, and Ohio Agric. Exptl. Sta., Wooster]

The author stresses the difficulties of controlling errors in the application of sprays to experimental plots, particularly when using low volume concentrated sprays. He describes a chemical sprayer he has designed to eliminate many of these difficulties. It uses compressed air as a source of pressure and has two spray knapsacks as spray tanks. A double boom gives very good coverage. The whole is mounted on a frame and can be propelled by one man. A speedometer is used to maintain constant speed. The sprayer is capable of giving a wide range of different rates of application. There is one illustration.—P.J.B.

766 GEORGIA Experiment Station. Bull. 260. **Cost and utilization of tractor power and equipment on farms in the Coastal Plain.** By *J. C. Elrod.* 1949, pp. 21.

Details are given of a project for determining cost and performance of tractors and tractor implements in the Coastal Plain of Georgia. Location, size and land-use of farms surveyed, and the amount and kind of work performed, are described.—S.D.

767 KEPNER, R. A., and LEACH, L. D. **A continuous spray-type seed treater.** *Agric. Engng, St. Joseph, Mich.*, 1949, **30**, 519-23 and 527.

Tests with an experimental unit for seed treating have been completed. The performance of the unit was evaluated with respect to mechanical difficulties, uniformity of seed coverage (its chief advantage) and the degree of protection afforded by fungicides.—S.D.

768 KEENEY, L. G. **Fire safety aspects of crop drying equipment.** *Agric. Engng, St. Joseph, Mich.* 1949, **30**, 579-80. [Farmers' Mutual Reinsurance Co., Grinnell, Iowa]

Some practical considerations of fire loss control are reviewed together with the fundamental problems involved. The limitations of artificial drying equipment are discussed and two general types of installation recommended; the one, a permanent drying unit installed in the drying building; the other, a portable drier to be used with single-batch bins separated from the storage buildings.—E.B.H.

769 ORCHARD, H. E. **Low volume spraying for weed control.** *J. Dep. Agric. S. Aust.* 1950, **53**, 294-308, bibl. 6.

The article illustrates and reviews the different kinds of weed killers and low volume spraying machines in use at the present day. Tests show that pressures of 100 lb. to 125 lb. per sq. in. are adequate and that at lower pressures there is less tendency for the spray to fog or drift. Low pressures tend to eliminate nozzle blockage and also give more uniform coverage. By adding oil to the spray solution and so decreasing the droplet size the discharge may be increased by 25 per cent. Where fogging and drifting will not cause damage and where penetration is necessary to give complete coverage during wind, high pressure spraying may be used with advantage.—K.O.

Diseases and Pests

770 HOSKINS, W. M. **How pest control programmes affect residues in foods.** *Agric. Chem.* 1949, **4**, 22-7 and 77.

Results from greenhouse and field work completed during 1944-48 are summarized to show the importance of season, formulation, dosage, and method of application of 2,4-D and 2,4,5-T in relation to the effective use of these non-hazardous herbicides for *Ribes* eradication. The two methods of treatment now in general use are: spraying intact plants with dilute aqueous solution (250 to 1000 ppm for 2,4-D and 2000 ppm for 2,4,5-T) acid equivalent; and decapitating individual plants and applying ester or amine concentrates (1 to 20 per cent) in oil or water to the freshly cut surface of the root crown.—From author's summary.

771 AGRICULTURAL CHEMICALS. **Eastern branch of AAEE reports results of tests on agricultural insecticides.** *Agric. Chem.* 1949, **4**, No. 12, 32-3.

Reports read at the 21st Annual Meeting of the Eastern Branch of the American Association of Economic Entomologists, indicate that some insect pests are developing resistance to certain insecticides: e.g. citrus thrips are developing resistance to DDT and flies resistance to BHC. The "off-flavour" in potatoes grown on soil dressed with 2.5 lb. per acre BHC could be prevented by applying 1 ton per acre of activated charcoal, or 5 lb. of hydrated lime per acre. Maize dusted five times with 30 per cent DDT or five times with 5 per cent TDE and harvested 13 days after the last application, contained 13.1 ppm DDT and 27.1 ppm TDE respectively. In the absence of sufficient rainfall larger quantities of DDT and TDE may be retained by maize plants at harvest. Other reports concern the effect of insecticides on Mexican bean beetle, rice weevils, flour beetles, and grain moths. —K.O.

772 MARTIN, H. **The limitations and advantages of the new insecticides.** *J. Minist. Agric.* 1950, **57**, 19-22. [Long Ashton Res. Sta., Bristol]

Certain new insecticides have greater insecticidal potency and stability. They are non-injurious to foliage, suitable for atomization and smoke application, and are economic and labour-saving. Further, they possess a diversity of insecticidal action, thus opening up avenues for future research on combined insecticides. Care must be taken when using DDT, BHC and parathion, which having a non-selective action, aggravated by high stability and persistence, makes them dangerous to beneficial insects. Parathion, owing to its toxicity to man, is not recommended.—E.B.H.

773 POTTER, C. **Modern insecticides and methods of application for plant protection.** *J. R. agric. Soc.* 1948, **109**, 175-90, bibl. 121. [Dept Insecticides and Fungicides, Rothamsted Expt Sta.]

An account of the different methods of application is given, followed by a description of the properties of some of the newer insecticides including DDT and its analogues, BHC, versicol 1068, toxaphene, the organic phosphorus derivatives, and the plant products *Sabadilla* and *Ryania*. In addition, some fumigants are described. Future development of insecticides in general is discussed.—S.D.

774 HENSILL, G. S. **Insecticides on seeds.** *Agric. Chem.* 1949, **4**, 29-30.

Work has recently been carried out in California on seed treatment with insecticides or insecticide/fungicide combinations before planting to prevent damage in the soil. The pure gamma isomer of hexachlorocyclohexane has proved efficient in wireworm control and may possibly be used against other pests; it imports no residual odours and the resulting crops are not tainted. Further tests are in progress to determine whether the wireworms are controlled or if the seeds are merely afforded protection. Results show that wireworms coming into direct contact with the insecticide are poisoned, but those deeper in the soil are unaffected. A table indicating the amounts of insecticide to use on seed is shown.—E.B.H.

775 SY, M. Über die Eignung von DDT-Präparaten zur Kornkäferbekämpfung. [**Suitability of DDT preparations in the control of the cornchafer.**] *NachrBl. dtsch. PflSch-Dienst* 1948, **2**, 5-10. [Plant Protection Service, Bonn a. Rh.]

776 MAYER, K. Die Bedeutung des Klimas bei der Enstehung von Epidemien unserer Kulturpflanzen. [**The importance of climate in the origin of epidemics among crop plants.**] *NachrBl. dtsch. PflSchDienst* 1948, **2**, 51-4, bibl. 16.

Climate is of first importance both in determining the origin and the limits of an epidemic. The effect of the yearly cycle and of the individual factors which make up climate, e.g. temperature, moisture content of air, rainfall, duration of sunshine, wind, air currents and air pressure, are discussed.—D.B.

777 GOULDEN, C. H., and STEVENSON, T. M. **Breeding for disease-resistance in Canada.** *Emp. J. exp. Agric.*, 1949, **17**, 222-8, bibl. 8.

The important flax diseases in Canada are *Fusarium oxysporum* f. *lini*, *Melampsora lini*, *Septoria linicola* and the more limited species *Colletotrichum linicola* and *Polyspora lini*. Diseases of forage crops are most prevalent among legumes, caused mainly by *Pseudopeziza medicaginis*, *Sclerotinia* spp., *Erysiphe polygoni* and *Kabatiella cantivora*. An outline is given of the breeding of flax varieties resistant to the above flax diseases ; of lucerne resistant to *Corynebacterium insidiosum*, winter crown rot, and blackstem caused by *Ascochyta imperfecta* ; and of red clover resistant to *Sclerotinia trifoliorum*.—S.D.

778 ROUATT, J. W., and ATKINSON, R. G. **The effect of the incorporation of certain cover crops on the microbiological balance of potato scab infested soil.** *Canad. J. Res.* Sect. C. 1950, **28**, 140-52, bibl. 16. [Sci. Serv., Agric. Dept. Ottawa]

The decomposition of soybean, rye and *Trifolium pratense* in soil naturally infested with potato scab resulted in marked changes in the soil microflora, but only soybeans reduced the incidence of potato scab disease.—P.J.B.

779 RAMACHANDRAN, S. **Some experiences with Gammexane (BHC) and DDT in the control of crop pests.** *Madras agric. J.* 1950, **37**, 22-7.

The experiments conducted with these two insecticides for the control of the red hairy caterpillar (*Amsacta albistriga*), the paddy grasshopper (*Hieroglyphus banian*), the paddy jassid (*Nephotettix bipunctatus*), the paddy swarming caterpillar (*Spodoptera mauritia*), and the rice bug (*Leptocorisa acuta*) have shown that BHC at the rate of 1.25 oz. in 1 gall. of water (0.5 per cent), is quicker in action and more effective than either the dust or the emulsion of DDT. Because of the high cost of these two insecticides, it seems that the time-honoured method of hand picking the moths and caterpillars is the simplest and most effective method of control.—K.O.

780 HILL, H. **Minor element deficiencies affecting Canadian crop production.** *Sci. Agric.* 1949, **29**, 376-83. [Cent. Exp. Fm, Ottawa, Ontario]

Experiments in Prince Edward Island indicate that when turnips occur in a rotation every 4 or 5 years, they require treatment with borax to prevent the occurrence of brown heart or water core. Tests showed that 15 to 20 lb. borax per acre gave satisfactory control on a variety of soils. The borax was applied (a) in the drill, (b) at the sides of the drill, (c) broadcast, (d) combined with the fertilizer and (e) sprayed on the soil or turnip foliage. Alfalfa yellows in British Columbia has been controlled by 30 lb. borax per acre. An application of 15 lb. per acre can be made to healthy green plants as a preventative measure. Cobalt deficiency of soils shows its effect on the health of the animals feeding on crops grown on such deficient soils. In some areas, animals feeding on a basal diet of non-leguminous hay and ground oats required 5 mgm. cobalt supplement daily for healthy growth. Control of manganese deficiency in soybeans and oats on alkaline soil was obtained by spraying the foliage with a one per cent solution of $MnSO_4$.—K.O.

781 PUTNAM, L. G. **The survival of grasshopper nymphs on vegetation treated with 2,4-D.** *Sci. Agric.* 1949, **29**, 396-9. [Dom. Entomol. Lab., Lethbridge, Alta]

When treated the main green vegetation on the plots consisted of stinkweed (*Thlaspi arvense*) in flowering and early fruiting stage, Russian thistle (*Salsola pestifer*) in the succulent foliaceous stage, lambs quarters (*Chenopodium album*) in vegetative to early flowering stage, and tumbling mustard (*Sisymbrium altissimum*) in rosette stage. There were few volunteer wheat or other graminaceous species present, therefore the grasshoppers had to feed on the weeds which soon showed the characteristic symptoms following 2,4-D treatment. With the exception of a few rosettes of tumbling mustard, the affected plants remained green for the duration of the experiment. Green weeds are probably important to ovipositing grasshoppers in stubble fields. If the general use of herbicides were to result ultimately in almost complete removal of susceptible weeds from cereals, the long-term effects on grasshoppers might differ from the immediate ones.—K.O.

782 ALASKA Agricultural Experiment Station. Circ. 9. **Insects of agricultural and household importance in Alaska, with suggestions for their control.** By *J. C. Chamberlin.* 1949, pp. 59. [Alaska Agric. Exp. Sta.]

This report is based on investigations in the Matanuska Valley during the years 1943-45 and deals with the many different insect pests and infections in Alaska, though more stress is given to descriptions of their external characters, life histories, distribution and control rather than to their hosts.—S.D.

783 TEXAS Agricultural Experiment Station. Bull. 712. **Charcoal rot of plants in east Texas.** By *P. A. Young*. 1949, pp. 33, bibl. 91.

The symptoms of charcoal rot (*Macrophomina phaseoli*) in the following farm crops are described: *Zea mays*, *Sorghum vulgare*, *Vigna sinensis*, *Phaseolus vulgaris*, *Ph. lunatus*, *Glycine max*, *Arachis hypogaea*, *Brassica rapa* and *Gossypium hirsutum*. A host index lists 284 plant species attacked. The severity of charcoal rot in farm crops is correlated with rainfall. Crops having their seedling and mature stages in cool rainy conditions suffer only a low incidence of this rot.—P.J.B.

784 HAGEDORN, D. J. **Wisconsin pea stunt, a newly described disease.** *J. agric. Res.* 1949, **78**, 617-26.

An apparently new virus is described. It represents the causal agent of a prevalent virus disease of peas found in Southern Wisconsin during recent years. Symptom descriptions on important hosts are given. On peas, the main symptoms are severe stunting of the plant, rosette appearance of the apical foliage, and premature death. The severity of the apical deformation caused by the virus increased with rise in temperature. The virus is limited in host range to the Leguminosae. The results from tests of different plants are tabulated. The virus was not infectious to certain members of the Solanaceae; legumes that showed no susceptibility were *Medicago orbicularis*, *M. sativa*, *Phaseolus vulgaris*, *Soja max*, *Trifolium repens*, *Vicia faba*, *V. villosa*, and *Vigna sinensis*. One plant of *Trifolium repens* developed mottle symptoms suggesting infection, but no virus was recovered. Only three of the fifteen hosts susceptible to the virus failed to produce symptoms. They were *Lupinus angustifolius*, *Vicia atropurpurea* and *V. monantha*. Other susceptible legumes include *Lathyrus hirsutus*, *L. odoratus*, *Melilotus alba*, *M. officinalis*, *Pisum sativum* var. *arvense*, *Trifolium hybridum*, *T. incarnatum*, *T. pratense*, *Trigonella foenum-graecum*, *Vicia grandiflora* and *V. sativa* All eighteen pea varieties tested were infected but none of the eleven bean varieties were susceptible. The Wisconsin pea stunt virus was still virulent after 10 days' freezing. The pea aphid (*Illinoia pisi*) was found to be a vector of the virus.—S.D.

CEREALS

MISCELLANEOUS

785 JOURNAL OF THE DEPARTMENT OF AGRICULTURE, ÉIRE. **Cereal variety trials at Department's farms, 1947**. *J. Dep. Agric., Éire* 1948, **45**, 85-7.

Spring oat. The varieties Glasnevin Triumph and Ardri were tested at three centres. Very slight differences in germination, vigour of growth, time of ripening and size of ear and grain were shown. There was no significant difference in yield, and no sign of disease or lodging.

Spring wheat. The varieties Atle and Progress were tested at three centres. Very little difference in establishment and time of ripening was shown, but Progress was taller and more vigorous in growth, and gave significantly greater yield than Atle at all three centres. There was no disease or lodging.—J.L.

786 JOURNAL OF THE DEPARTMENT OF AGRICULTURE, ÉIRE. **Field experiments, 1947**. *J. Dep. Agric., Éire* 1948, **45**, 71-7.

In the spring-wheat variety trials of 1946, Progress gave significantly higher yields than Atle, but ripened later. In 1947, trials were conducted with these varieties in all counties (58 centres). Each wheat plot of 0.5 acre following manured root crops. Tables showing detailed results are given. Progress was generally more vigorous and rather longer in straw than Atle but no serious lodging was reported for either variety. Black rust was reported to attack Progress more severely than Atle at 9 centres, Yellow rust was more severe on Atle at 5 out of 7 centres. Time of ripening was about the same but Progress gave significantly higher yields. Mean yield of 57 centres: Progress, 17.06 cwt.; Atle, 15.68 cwt.; (standard error 0.333 cwt.) The grain of Progress was larger and more attractive than that of Atle. In the barley variety trials, two Swedish varieties Ymer and Freja were compared with Spratt Archer 37 No. 3 at 16 centres on 0.333 acre plots. Ymer and Freja were generally shorter in straw than Spratt Archer; there was no lodging at 9 centres, Spratt Archer lodged at 7 centres, Freja at 5 and Ymer at 3. There was no significant difference in yield. The quality of the Spratt Archer grain was uniformly high, while Ymer and Freja were less uniform, darker and less attractive. Ymer and Freja have shorter straw and ripen appreciably earlier than Spratt Archer.—J.L.

787 JOURNAL OF THE DEPARTMENT OF AGRICULTURE, ÉIRE. **Trials with agrocide.** *J. Dep. Agric., Éire* 1948, **45**, 77-9.

In 1947 trials to test the value of agrocide as a control for wireworm in spring cereals were carried out at 102 centres in 22 counties. Duplicate 0.125 to 0.5 acre plots were dressed at the rate of 2 cwt. per acre. The dressings at 86 centres were applied at about the time of sowing and some measure of control was observed at 25 centres out of 33 where wireworm attack was reported, but at only 10 of these centres was control effective. When applied at the tillering stage, effective control was obtained at 5 centres only, out of 10 attacked. Similar trials on control of leather-jacket grubs were conducted at 30 centres, but the results were inconclusive. Treatment with Paris Green gave complete control of leather jackets on Diamante wheat but the effect of an agrocide dressing was very slight. Cereals planted in 1947 on plots treated with agrocide in 1946 showed better growth at all five centres where leather jacket attack was reported.—J.L.

788 MUELLER, K. Ernste Schäden in Getreidekultur. [**Serious damage to cereal crops.**] *NachrBl. dtsch. PflSchDienst* 1948, **2**, 10-1. [Plant Protection Service, Halle/S.]

Following the dry summer of 1947, it was not possible for the normal-sized furrow to be made by the plough so that in places cereal seedlings failed to develop owing to too deep sowing. The remedy consists of the earliest possible cultivation of the soil and shallow sowing. Rye was the most sensitive to deep sowing, barley and wheat less so.—D.B.

789 TIDSSKRIFT FOR PLANTEAVL. Betænkning vedrørande fremavl av saedekorn. [**Report on growing-on of seed grain.**] *Tidsskr. Planteavl* 1949, **53**, 1-32.

The report which was drawn up following an enquiry conducted by a committee appointed in 1939, whose members represented various Danish organizations and institutions interested in the growing-on of seed grain, was presented to the Seed Control Commission in January 1948. The published report presents information under the following four headings: sources of changes in and contamination of varieties; quality of seed grain sold in Denmark; organization of growing-on and quality requirements in other countries; directions for growing-on. —R.P.J.

790 KUPERMAN, F. M. [**Irregularities in development of the rudimentary ear in cereals.**] [Russian] *Doklady Vsesojuz. Akad. S.-H. Nauk* 1950, **15**, 33-8.

The material investigated comprised Milturum 321 spring wheat, Viner spring barley, Golden Rain oats and Dolinsk millet: sowings were carried out every 5 days from spring to late autumn. In certain periods of growth and development of the rudimentary ear, during a term of about 10 days, no clearly perceptible changes in measurements and degree of differentiation of the organs are to be noted; in other periods, sharp changes occur in the structure of the ear, of the panicle and of the majority of the spikelets. In wheat, rye and barley development of the spikelets proceeds most intensively in the middle part of the ear. Irregularity of development occurs also in each spikelet in wheat and rye, where first the two lower florets develop, then the third, the fourth and the following ones if conditions of growth and nutrition permit. In oats, development of the panicle proceeds most intensively in the upper part where the spikelets develop first and are formed very rapidly. Compared with the ear of wheat and barley, the process of formation of spikelets in the panicle of oats and millet extends over a considerably longer period.—R.P.J.

791 KUPERMAN, F. M. [**Mechanical injury of seeds.**] [Russian] *Selek. Semenovod.* 1950, No. 3, 45-8.

Plants which have developed from damaged seeds are considerably less resistant to parasitic micro-organisms and are seriously injured by insect pests. Data from experiments at Barnaul Plant Breeding Station to determine energy of germination of injured and uninjured seed of spring wheat, winter wheat, oats and barley indicated that in plump, first quality seed, field and laboratory germination was nearly 100 per cent: when even slight cracks were present, field germination was reduced by 16 per cent compared with laboratory germination. Wheat plants from injured seeds were inferior to normal plants from best quality seeds in height, width of leaves, bushiness and accumulation of organic matter. Observations carried out during 2 years indicate that first quality seeds with whole, undamaged seed coats are well protected from attack by parasitic and saprophytic microflora. A diminution in the vitality of plants from damaged seeds and a lowering of their resistance to diseases and pests result in a considerable reduction in the general productivity and yielding capacity of cereal crops.—R.P.J.

792 HARRINGTON, J. B. **Testing cereal varieties for dormancy.** *Sci. Agric.* 1949, **29**, 538-50, bibl. 9. [Univ. Saskatchewan, Saskatoon]

With the object of improving existing procedures and devising a suitable preliminary test for hybrids experiments on spring and winter varieties of wheat, oats and barley were conducted in 1947 and 1948, using both threshed and unthreshed seeds. Seeds were stored for various lengths of time (10, 20 and 30 days) after maturity, and germination readings were made from cloth-covered beds of moist sand after 5, 10 and 15 days. Results indicated that these short tests would clearly separate short and long dormancy varieties in one season. For more accurate ranking of varieties or lines, a 2-years' test would be necessary, especially for oats. The varieties of each crop showed a wide range of dormancy in both years. There was general agreement between results for unthreshed and threshed seed.—A.D.H.

793 WISCONSIN Extension Service of the College of Agriculture. Circ. 338. **Sow winter grain for food and feed in northern Wisconsin.** By *E. J. Delwiche*. 1943, pp. 6. [Univ. Wisconsin, Madison]

Trials at Ashland, Marshfield and Sturgeon Bay show that winter wheat and rye produce yields superior to spring sown grains if planted very early in September at a minimum rate of 2 bu. per acre. They are a labour saving crop, requiring no pre-sowing ploughing and are ready for harvest in the spring. Weeds such as quackgrass and Canada thistle can be reduced by mid-summer fallowing, and in addition the winter grain provides a good cover crop against wind and water erosion. New seedings can be made in spring.—E.B.H.

794 THOMAS, I., and CARISS, H. G. **Pedigree seed production.** *J. Dep. Agric. W. Aust.* 1949, **26**, 215-26, bibl. 4.

Details of pedigree seed production and pure seed distribution of wheat, oat and barley varieties by the Department of Agriculture are given for the three zones of the wheat belt.—K.O.

WHEAT

795 OLIVEIRA, A. J. de. Estudos de estatística agronómica. IV. Importância da amostragem na experimentação agrícola. **Studies in agronomic statistics. IV. The importance of sampling in agricultural trials.** *Agron. lusit.* 1948, **10**, 201-29. [English summary, p. 228], table, bibl. 14. [Est. Agron. Nac., Sacavém, Portugal]

The sampling and experimental errors of two experiments have been computed. In a field trial of wheat at Alandroal, 170 km. east of Lisbon, the application of sampling methods with a sampling percentage of 2.1 has given a loss of information of 40 per cent, but with doubled sampling the gain in efficiency should be appreciable. Comparison of the results by sampling and full harvesting showed conclusions to be practically the same ; an explanation is given of an abnormal case of treatments A, B, and C. In a uniformity trial of potatoes the relative efficiency obtained with various types of sampling units was great. The effect of subdivision is briefly discussed.—From author's summary.

796 HOPKINS, E. S. **Wheat production in Canada.** *Emp. J. exp. Agric.* 1949, **17**, 92-104. [Cent. Exptl Farm, Ottawa]

The trends in yields, acreages, and distribution of wheat in Canada from the beginning of the century to the present day are analysed. The effect of rainfall, evaporation, and rust in producing wide fluctuations in wheat yields, and the results of grain-farming on soil fertility are considered. Plant breeding has largely eliminated, at least for the present, the menace of rust attack, while new methods of cultivation are reducing the risks of soil erosion ; but wide fluctuations in wheat yields must still be expected and world requirements rather than Canadian needs will determine the future Canadian wheat acreage.—T.D.H.

797 SCHREIBER, R. Über den Einfluss der Magnesiumgehalte der verschiedenen Kalidüngemittel auf Ertrag und Qualität von Sommerweizen. [**The effect of magnesium content of different potassium fertilizers on yield and quality of summer wheat.**] *Z. PflErnähr. Dung.* 1949, **43**, 69-77. [Justus-Liebig-Hochschule, Giessen, Germany]

798 COMMONWEALTH AGRICULTURIST. **Wheat growing experiments. Lessons from research farms.** *Commonw. Agriculturist* 1949, **19**, 46-54.

Brief reports from the following establishments are given :—Werribee Research Farm, Longerenong Agricultural College, Dookie Agricultural College, Rutherglen Experimental Farm and Mallee Research Station. Each report includes a list of wheat varieties recommended for the surrounding districts, and the results of various manurial trials. On some soils at Longerenong, additions of traces of zinc sulphate resulted in increases in yield of the order of 5 per cent.—R.N.H.W.

799 COMMONWEALTH AGRICULTURIST. **Wheat growing problems. Maintaining soil fertility.** *Commonw. Agriculturist* 1949, **19**, 55-8.

Management of the fallow preceding the wheat crop is discussed. Oats can be autumn-sown and grazed, the land then being fallowed in the spring. The problem of burning versus ploughing in stubble is considered. At Longerenong Agricultural College a trial has been laid down to test eight treatments connected with these two methods.—R.N.H.W.

800 CARDOSO, F. P. Dá trigo em São Paulo? [**Wheat production in the State of São Paulo** ?] *Rev. Agric. Piracicaba* 1950, **25**, 47-52.

An article reprinted from *O. Estado de São Paulo*, Brazil, gives an account of promising wheat cultures at various stages of development occupying 320 alqueires [1 alqueire = 24,200 sq. m. in S.

Paulo] and presenting a good appearance although the year had been exceptionally dry, the autumn and winter rains having been far below the average. Deep ploughing and very careful tillage had preceded sowing. The variety used was Frontana, which is unusually tolerant of soil acidity. It is considered that wheat growing might be greatly extended with much profit to the State and the national economy. Cultural and manurial techniques are discussed together with the adaptation of the cropping system, and attention is drawn to some methods employed in South Africa.—G.M.R.

801 ROMAŠČENKOV, D.D. [**Influence of tillering of spring wheat on yield and quality of grain.**] [Russian] *Selek. Semenovod.* 1950, No. 2, 30-5.

Vigour of tillering in spring wheat increases the yield of the main ear. As a rule the greater the vigour of tillering, the higher the yield of grain, and the better its quality, compared with more weakly tillering plants and non-tillering plants. Vigour of tillering increases the yield of both the tillers and the main ear, without impairing the quality of the total yield.—R.P.J.

802 THOMPSON, E. G. **Spring wheat.** *Farming* 1949, **4**, 10-12. [Nat. Inst. Agric. Bot.]

The author compares spring with winter wheat and lists a number of conditions under which the sowing of spring wheat offers special advantages. Some points of the varieties Bersee, Atle, Meteor, Fylgia and April Bearded are discussed.—S.D.

803 ÅKERMAN, Å. Svälofs Roburhöstvete, 01420. [**Svalöf Rubur winter wheat, 01420.**] *Sverig. Utsädesfören. Tidskr.* 1949, **59**, 269-76, [English summary, pp. 275-6].

Svalöf Robur wheat was placed on the market in the autumn of 1949. It is the result of a comprehensive breeding programme designed to combine high yield and winter hardiness by crossing high-yielding south Swedish varieties of west European extraction with the most outstanding selections from Swedish indigenous wheats. In this case the cross used was Scandia II × Sv. 36/175, the latter parent being a high-yielding line selected from a wheat indigenous in the province of Västergötland. Robur has been released as a complement to Odin where a more winter-hardy type is required. Under favourable conditions Robur gives a somewhat lower yield than Odin and has decidedly weaker straw. Good yielding capacity has been combined with excellent winter hardiness in Robur, which has outyielded Ergo by 6 per cent (94 trials), Borg by 4.6 per cent (80 trials), Ergo II by 2.7 per cent (39 trials), Aros by 2.4 per cent (54 trials) and Virtus by 1.1 per cent (79 trials). The grain of Robur is of very good quality with a high hectolitre weight: it has a high content of crude protein.—R.P.J.

804 MIÈGE, E. Les principales espèces et variétés de blé cultivées en Afrique du Nord. [**Principal species and varieties of wheat cultivated in North Africa**] *Rev. Bot. appl.* 1950, **30**, 16-38, bibl. 27.

Wheat grown in North Africa covers an area of over 3,500,000 ha. Although other species are occasionally encountered, *Triticum durum* and *T. vulgare* are the only ones at present grown on a large scale. The distribution and characteristics of the various species and varieties in North Africa are given. It is generally admitted that Abyssinia is the primary centre of *T. durum* and North Africa a secondary centre. In the latter country a great number of forms are present especially in mountain regions. A description of the forms of *T. durum* found in the three French colonies is provided, with particular consideration to those of Morocco. An account of improvements carried out by means of selection, hybridization and introductions from other Mediterranean regions is also given. Vernacular names are included.—E.B.

805 MIÈGE, E. Les principales espèces et variétés de blé cultivées en Afrique du Nord. [**The principal species and varieties of wheat grown in North Africa.**] *Rev. Bot. appl.* 1950, **30**, 203-15, bibl. 11.

[See previous abstract.] This second and last part of the article deals with *Triticum vulgare*. Cultivation of this species has developed in the three colonies only since the French occupation. Information is given on crop areas and on improvements made by means of selection, hybridization and introductions from abroad. The work of the centre for Agronomic Research at Rabat is mentioned.—E.B.

806 WASHINGTON State College. Bull. No. 450. **Comparative performance of wheat varieties in eastern Washington.** By *O. A. Vogel* and *O. E. Barbee.* 1944, pp. 28.

Data on comparative varietal performances of 38 varieties of wheat tested during 1931-43 at Pullman, Walla Walla and Pomeroy, are presented. The comparisons are made on the basis of yield, test weight, shattering, time of maturity, plant height, lodging and winter survival. Special attention is given to the varietal responses which influence their usefulness in wheat production of the State.—From author's summary.

807 HEHN, E. R., and GRAFIUS, J. E. **Resistance of spring wheat varieties to grasshopper attack.** *Agron. J.* 1949, **41**, 467-9. [S. Dakota Agric. Exp. Sta., Brookings, S.D.]

This paper presents the results of an investigation of several histological characteristics of spring wheat varieties and their effects on the preferential feeding of the grasshopper, *Melanoplus bivittatus.*

The amount of mechanical tissue in the hypodermal region of the culm in sections taken 1 cm. below the peduncle showed a strong negative relationship to the percentage of heads clipped by the two-striped locust or grasshopper. Selection of lines with an abundance of mechanical tissue in the hypodermal region of the culm, 1 cm. below the peduncle has been suggested as a criterion for isolating lines of spring wheat that are highly unpalatable to grasshoppers.—S.D.

808 Holton, C. S., Bamberg, R. H., and Woodward, R. W. **Progress in the study of dwarf bunt of winter wheat in the Pacific Northwest.** *Phytopathology* 1949, **39**, 896-1000, bibl. 15.

This paper constitutes a report on the progress of studies begun in 1942 to elucidate some of the factors relating to behaviour and control of *Tilletia caries*. It occurs in a wide range of climatic conditions and soil types and can be controlled only by breeding resistant varieties (those carrying the Martin-Hussar gene complex). Cache Hymar, Rex, Relief and Wasatch and several hybrid selections with dwarf bunt resistance are now available for breeding stock.—E.B.H.

809 Agricultural Gazette of New South Wales. **Winter wheat breeding programme at Glen Innes and Yanco.** *Agric. Gaz. N.S.W.* 1949, **60**, 640.

With the object of breeding early maturing wheats of winter habit, new breeding programmes have been established at the New England Experiment Farm, Glen Innes, and at Yanco. The only Australian variety recorded as possessing winter habit characteristics is a selection made from Winter Minflor, but this is not yet available commercially. —S.D.

810 Krall, J. L. **Injury and shattering of winter wheat treated with 2,4-D.** *Agron. J.* 1949, **41**, 585-7. [Cent. Montana Branch Sta., Moccasin, Mont.]

Under certain Central Montana conditions 2,4-D increased shattering in winter wheat when this was sprayed at the early jointing stage. The degree of shattering was proportionate to the rate of 2,4-D applied. Yogo winter wheat was more tolerant to shattering induced by 2,4-D treatments than other wheat varieties tested. A relationship between percentage of head abnormalities and shattering was evident.—From author's conclusions.

811 Björling, K. Stråbassjukdomar hos sädesslagen och deras betydelse för liggsädesbildningen. [**Foot rot diseases of cereals and consequential lodging.**] *K. LandtbrAkad. Tidskr., Stockh.* 1948, **87**, pp. 418-33, bibl. 12, [English summary, p. 431-3].

Lodging caused by eyespot (*Cercosporella herpotrichoides*) occurs mainly in winter wheats in the southern and central parts of Sweden. Conditions affecting the intensity of eyespot and take-all (*Ophiobolus graminis*) are discussed, as are control measures. Field trials at Svalöf indicate that recently bred varieties of winter wheat show improved resistance to eyespot, but no greater resistance to take-all. It is considered that the increased use of combine harvester-threshers in Sweden may lead to a higher prevalence of eyespot and take-all. In this connexion, trials are in progress to determine the influence of length of stubble on the prevalence of these diseases.—P.J.B.

812 Klinkowski, M., and Eichler, W. Starkes Auftreten des roten Weizenblasenfusses (*Haplothrips tritici*) in Mitteldeutschland und seine Beziehung zur Spitzentaubheit des Weizens. [**Heavy incidence of red wheat thrips (*Haplothrips tritici*) in Central Germany and its relation to sterile grain in wheat.**] *NachrBl. dtsch. PflSchDienst* 1948, **2**, 43-6, bibl. 16. [Centr. Inst. Agric. and For., Sub-station Aschersleben]

In 1947, in the province of Saxony, thrips was widespread in cereal fields. In the attacked wheat fields the insects were present on almost every ear and were found between the glume and the grain. In this region there was also a high incidence of sterile grain in the ear tips. Such ears appeared white. There was a marked relationship beween sterile ears and variety but none between sterile ears and number of plants attacked by thrips. The cause of sterile ears is a physiological one and thrips is only a very minor secondary cause conditioning onset of the disease.—D.B.

813 Vanterpool, T. C. **A note on the cause of brittle dwarf of wheat.** *Sci. Agric.* 1949, **29**, 351-3. [Univ. Saskatchewan, Saskatoon]

The name brittle dwarf was suggested by Fraser *et al.* in 1932, for a disease of winter and spring wheats characterized by a stunting and extreme brittleness of the culms, usually accompanied by a proliferation of the shoots and yellow mottling and streaking of the leaves. Other occasional features were malformed heads, distorted peduncles, and twisted terminal leaves. Aphids were frequently present in large numbers under the leaf sheaths and in twisted leaves. Experimental results give no indication that a virus is associated with the disease. They point strongly to the conclusion that the disease is caused by the western wheat aphis.—Adapted extracts.

OATS

814 Jones, E. T. **The breeding of disease resistant varieties of oats. Pt. II. Inheritance of disease-resistance.** *Emp. J. exp. Agric.* 1949, **17**, 205-13, bibl. 41. [Welsh Plant Breeding Station, Aberystwyth]

See also *Fld Crop Abstr.* 3. Abs. 397. A detailed account is given of inheritance resistance of oats to loose and covered smuts and to skin and crown rusts. A description of recent progress in breeding resistant varieties, and of breeding technique is included.—S.D.

815 Northern Ireland. Monthly Report of the Ministry of Agriculture. **Results of oat variety trials.** *Mon. Rep. Minist. Agric. N. Ire.* 1949, **24**, 109-12.

The following oats, suited to high fertility conditions, were tested: Crown, Stormont Arrow, Stormont Iris, Glasnevin Ardri, S. 225 (Milford), The Elder, Stormont Grandee and Utility. Summaries of results are given. No single variety was outstanding. The varieties Stormont Kern, Ayr Line, Tyrone Tawny and Gordon Sandy suited to poor soils were also tested. Utility was included in these latter trials. The report contains brief notes on all the above varieties.—R.N.H.W.

816 Coffman, F. A., Rodenhiser, H. A., and Taylor, J. W. **New varieties for the Northern winter oat regions.** *Agron. J.* 1949, **41**, 551-4, bibl. 16. [Agric. Res. Admin., U.S. Dept Agric.]

The new strains of oats, Atlantic, Arlington, and Coy, approach the leading autumn-sown variety Lee in hardiness, may exceed it in forage growth, are decidedly earlier, have taller, stiffer straw, and have out-yielded it in the tests made so far. Atlantic and Arlington have good resistance to ordinary races of crown rust and to mosaic; Coy is less resistant. Their parentage is given.—A.D.H.

817 Kehr, W. R., and Hayes, H. K. **Studies of inheritance in crosses between Landhafer, *Avena byzantia* L., and two selections of *Avena sativa* L.** *Agron. J.* 1950, **42**, 71-8. bibl. 6. [Div. Agron. and Plant Genetics, Univ. Minnesota, St. Paul.]

See *Plant Breed. Abstr.*

818 Wisconsin Agricultural Experiment Station. Bull. 462. **Vicland oats.** By *H. L. Shands* and *B. D. Leith.* 1944, pp. 15.

The Vicland variety is a result of crossing Victoria and Richland at the Arlington Research Farm, Virginia, in 1930. It is early maturing, high yielding and highly resistant to several major diseases and to lodging. It increases rapidly and its bushel weight is high even in bad oat years. It performs best when sown early on fertile soils in a fairly rough seedbed. The seed rate varies but is usually about 64 lb. per acre. Vicland is well adapted to combining, having good straw of medium length and above medium strength. The grain must be properly dry before storing otherwise it tends to sweat and mould. Certified seed is available from the above Station.—E.B.H.

819 Mascazzini, F. Revisión de métodos para el ensayo germinativo de semilla de avena. [**Revision of germination tests for oat seeds.**] *Bol. Prod. agríc.* 1949, **1**, No. 3, 8-9. [Seed Test. Div., Dir. Fomento Agric., Buenos Aires]

Germination tests lasting 8 days were made of oats from seven different sources. Five methods differing in regard to the temperatures employed, were compared. Alternating temperatures of 18 hours in a cold chamber at 4°C. and 6 hours in an incubator at 23°C. were found to be the most satisfactory. Oats should be kept for a minimum of approximately 60 days before being used for sowing.—G.M.R.

820 Paloheimo, L. **An unusual method for determining the percentage of hulls in oats.** *Maataloust. Aikakausk.* 1949, **21**, 121-3, [Finnish summary, p. 123.] [Dept Animal Husbandry, Helsinki University]

The most convenient and reliable means for establishing the feed value of oats is probably the determination of the percentage of hulls. Recently, in the above Department, rats have been used for hulling the oats since they eat only the kernels, discarding the hulls. A description is given of the procedure adopted. A comparison between the results obtained with de-hulling by hand and by means of rats indicated that the work can safely be entrusted to rats.—R.P.J.

821 Bartholomew, W. V., Nelson, L. B., and Werkman, C. H. **The use of nitrogen isotope N^{15} in field studies with oats.** *Agron. J.* 1950, **42**, 100-3. bibl. 6. [Iowa Expt Sta., Ames.]

The uptake of fertilizer nitrogen by oats was investigated using nitrogen isotope N^{15}. Results showed that the uptake of fertilizer nitrogen was markedly influenced by the time and rate of applications.—P.J.B.

822 Noble, M. **Halo blight of oats.** *Scot. J. Agric.* 1949, **29**, 162-5.

Halo blight (*Pseudomonas coronafaciens*) has been suspected in Scotland for some time but has only become widespread in recent years. Manifesting itself in the form of a pale green spot, 0.75 in. across, with a very small dark-brown spot in the centre, it is seed-borne, and attacks plants at 4 to 5 leaf stage. It is prevalent on ploughed lea or soil with a high nitrogen content. It may be confused with leaf spot, grey speck and *Septoria*. No complete control has yet been found, but encouraging results have been obtained by treating seed with formalin. Experiments with a double treatment, formalin plus an organo-mercurial dust, are contemplated, which, if successful, will also control leaf spot and foot rot. This treatment will be applied to stocks of *élite* seed.—E.B.H.

BARLEY

823 Covas, G. El prototipo de las cebadas cultivadas. [**The prototype of cultivated barleys.**] *Cienc. Invest.* 1950, **6**, 236-7, bibl. 5.

The different species of *Hordeum* which may be ancestors of *H. vulgare* L. are discussed. The author concludes that the progenitor of cultivated barleys is not known. Of wild forms, *H. spontaneum* seems to be a prototype.—D.P.B.

824 Malcolm, J. P. **Classification of barley varieties in New Zealand.** *N. Z. J. Sci. Tech.* Sect. A. 1949, **30**, 305-28, bibl. 14. [Agron. Div., Lincoln]

Various morphological characters of barley have been reviewed for use in the classification of varieties grown in New Zealand. Characters most stable under varying environments were utilized for individual variety descriptions and for the arrangements of identification keys.—Author's summary.

825 Schaller, C. W. **Inheritance of resistance to loose smut, *Ustilago nuda*, in barley.** *Phytopathology* 1949, **39**, 959-79, bibl. 16. [Div. Agron., Univ. California, Davis, Calif.]

See *Plant Breeding Abstracts*.

RYE

826 Namžilov, B. S. [**Spring rye in Zabaikalje (Burjat-Mongolian ASSR).**] [Russian] *Selek. Semenovod.* 1950, No. 2, 54-5.

Spring rye is unexacting as to climate and soil. It is well adapted to conditions in the BMASSR. In 1947 the early variety Onohoisk comprised 8 per cent and in 1949 40 per cent of the total area sown with spring rye. The weight of 1000 grains of Onohoisk varies from 25 to 27 grm., while that of winter rye of the Udinsk variety is only 15 grm. Spring rye gives higher yields than winter rye.—R.P.J.

827 Teixeira, J. B. As impurezas do centeio produzido em Portugal. (Ensaio de caracterização.) [**Impurities in the rye grown in Portugal. (Attempt at characterization).**] *Agron. lusit.* 1948, **10**, 123-57, [French summary, pp. 153-5], 3 tables, 1 pl., bibl. 34. [Est. Agron. Nac., Sacavém, Portugal]

Sixty 1-litre or 740-grm. samples of Portuguese rye from the 1946 harvest were studied for weed seed content and other extraneous matter. Tabulated data are presented and show that botanically, the largest number of weed species belonged to the families Gramineae and Leguminosae; geographically, the largest percentage of weed seeds (47.3) were of Mediterranean origin, 36.9 per cent being cosmopolitan species and the remaining small proportion Atlantic, European and Iberian species. There was a highly significant dominance of therophytes (78 per cent). Weed species characteristic of Portuguese rye grown in poor siliceous soils are listed, and comparison is made of the species found exclusively in rye and wheat. Other points considered are thousand-grain weight, dimensions, toxicity, and the weed species indicative of regional origin.—G.M.R.

MAIZE

828 Mann, H. H. **Growing maize for grain in England.** *Countryman* 1950, **41**, 319-21, illus. [Woburn Experimental Station, Bedfordshire]

A brief note on past attempts to grow maize for grain in England is followed by an account of successful trials at Woburn in 1948 and 1949. Earlier trials made by the author over a period of thirteen years showed little success. The four successful varieties tested in 1948-49 were Wisconsin hybrid strains representing some of the earliest varieties that the Americans have yet produced by double crossing. In the U.S.A. they are said to ripen in 80-85 days but at Woburn they needed 180-200 days in 1948 and 155-165 days in 1949. They were sown, 24 in. each way, in April and harvested in September and early October. Yields, in all but one case, were over a ton of dry grain per acre in each year, but one variety, W275, gave over 44 cwt. per acre in 1949 [number and size of trial plots not given]. The crops were grown on land of fair fertility, the only fertilizer used being sulphate of ammonia [quantity not stated]. The success of these early hybrid strains indicates that maize may yet become a useful grain crop in Britain. It would seem to be a very suitable one for smallholders.—A.G.G.H.

829 Kretschmer, G. Vergleichende Beobachtungen an Mais nach extremer Schlechtwetter-Periode. [**Observations on maize after extreme bad weather.**] *Z. PflErnähr. Düng.* 1949, **44**, 130-5. [German Meteorological Service of the French Occupation Zone, Buchenbühl]

The effect of microclimate.—D.B.

830 BARGER, G. L., and THOM, H. C. S. **Evaluation of drought hazard.** *Agron. J.* 1949, **41**, 519-26. [Iowa Agric. Exp. Sta., Ames]

It is suggested that rainfall totals can be estimated for each station by a method described and so provide (1) a basis for comparing rainfall distribution in different areas, and (2) a method for forecasting the likelihood of receiving the minimum amount of rain necessary to produce a normal maize crop.—A.D.H.

831 KELLERMANN, G. Essais sur la fréquence des arrosages dans la culture irriguée du maïs dans le centre Viet-Nam. [**Trials to determine the frequency of irrigation in maize cultivation at Viet-Nam.**] *Agric. Trop.* 1949, **4**, 531-6.

In some parts of Indo-China the rainfall is insufficient for maize cultivation and must be supplemented by irrigation. Trials were carried out at Viet-Nam using winter maize (sown in December, harvested in March) and summer maize (sown April/May, harvested June/July) to determine at what intervals and in what volume the irrigations should be given. Results showed that fortnightly applications were best for winter maize, weekly applications for summer maize. In neither case was irrigation recommended before the appearance of the third leaf.—E.B.H.

832 BUCHINGER, A. Verschiedene Fragen über den Mais mit besonderer Berücksichtigung dreijähriger Versuchsergebnisse mit amerikanischen Hybriden. [**Several problems regarding maize, with special reference to results of a three year trial with American hybrids.**] *Bodenkultur* 1949, **3**, 506-34. [State Inst. Plant Cultivation and Seed Testing, Vienna]

An account is given of the qualities of maize from 1946-48 trials of American hybrids in localities having different climates. The policy is not to replace ordinary maize with hybrid maize entirely, but to grow the latter in those localities where temperature, moisture and soil are most favourable and to grow ordinary maize in localities with less favourable growing conditions.—D.B.

833 HASKELL, G. **New sweet corn from America.** *J. Minist. Agric.* 1949, **56**, 410-5. [John Innes Hort. Inst., Merton Park]

Several hundred strains of sweet corn were introduced from the U.S.A. after a careful examination of each strain to assess their suitability for the English climate. The strains were (1) open pollinated varieties, selected by American commercial plant breeders for early maturity and quality of ears, and (2) hybrids which have been bred, both by commercial firms and geneticists at the State and Federal Experiment Stations, for earliness and uniformity and high yield. Records of each strain tried at Merton in 1948, are tabulated, showing strain, source of seed, earliness, yield per acre, marketable ears, and raw ear quality. The best hybrids and varieties are still Extra Early Bantam, Seneca 60 × C13, John Innes Hybrid No. 1 and Northern Cross. Later hybrids with good yields are C37.30 × 1184 and C40 × 1184. Golden Security yielded well, but was far too late. Golden Cross Bantam, which is the most popular hybrid in the U.S.A., was also too late.—S.D.

834 ILLINOIS Agricultural Experiment Station. Bull. 533. **Yields of corn hybrids harvested for silage.** By *W. B. Nevens* and *G. H. Dungan.* 1949, pp. 17.

Trials have been conducted by the University of Illinois at Urbana from 1942 to 1946 to test twenty-five maize hybrids. The dry matter content of ears, leaves and stalks, as well as the total yield, protein content, resistance to lodging and days to harvest are reported.—R.N.H.W.

835 IOWA Agricultural Experiment Station. Bull. P97. **Iowa corn yield test 1948.** By *C. D. Hutchcroft* and *J. L. Robinson.* 1949, pp. 56.

In 1948, 326 hybrid varieties of maize were tested. Each was replicated six times at each of three centres. Tabulated results show: the yield per acre, grain moisture, ear height, percentage stand, the content of lodging and dropped ears. For each variety a "performance score" is calculated from the figures for yield, moisture, lodging, and ear dropping. Average results during several years are also quoted.—R.N.H.W.

836 IOWA Agricultural Experiment Station. Res. Bull. 372. **Acceptance and diffusion of hybrid corn seed in two Iowa communities.** By *B. Ryan* and *N. Gross.* 1950, pp. 663-708.

837 OKLAHOMA Agricultural Experiment Station. Misc. Publ. M.P.-16. **Performance tests of corn varieties and hybrids 1949.** By *J. S. Brooks* and *H. Pass.* 1949, pp. 39.

838 OKLAHOMA Agricultural Experiment Station. Tech. Bull. No. 36. **The protein and crude carotenoid content of hybrid and open-pollinated corn; a summary.** By *J. E. Webster, J. S. Brooks* and *C. B. Cross.* 1949, pp. 7.

Hybrid maize varieties in the tests described had a slightly lower average protein content, and a considerably lower carotene content, than open pollinated varieties, though some hybrid varieties contained as much protein and nearly as much carotene as the open pollinated varieties, which points to the possibility of selecting hybrid varieties for high protein and carotene content.—P.J.B.

839 TEXAS Agricultural Experiment Station. Bull. 706. **Mechanical harvesting of corn.** By *H. P. Smith* and *J. W. Sorenson*, Jr. 1948, pp. 38.

Tests were made with the two maize hybrids, Texas 8 and Texas 12, and the open-pollinated corn varieties "Yellow Dent" and "White Surcropper", harvested in August, September and October. Lodging, dryness and brittleness of stalks were especially noticeable with later harvesting. Loss of ear was more marked than the average percentage loss of shelled corn. The percentage of totally husked ears varies more with type of corn than date of harvest: e.g. "Texas 12," (light loose husk) has an average of 40.8 per cent compared with "Surcropper" (tightly compacted husk, 17.4 per cent), with correspondingly high and low per cent partially shelled ears respectively.—M.L.Y.

840 GEORGIA Experiment Station. Circ. 163. **Corn performance tests 1949**. By *G. A. Lebedeff*, *O. L. Brooks* and *M. B. Parker*. 1950, pp. 16.

A tabulated summary of performance tests carried out in four different regions of Georgia on a number of the maize hybrids and varieties most used in Georgia.—P.J.B.

841 MIMEUR, Geneviève. L'origine du maïs et les variétés indigènes au Brésil. [**The origin of maize and the indigenous varieties of Brazil.**] *Rev. Bot. appl.* 1949, **29**, 621-6.

The author summarizes the work of Prof. F. G. Brieger of the University of São Paulo, Brazil, who is of the opinion that the maize centre of origin was in the midst of the three primary regions of domestication, namely, the Paraguay/Parana valley, the southern part of the Amazon valley, and the old empires of the Andes. The Brazilian varieties, for which local or French names are given, are described. [See also *Fld Crop Abstr.* 3, Abs. 289]—E.B.

842 CUTLER, H. C. **Races of maize in South America.** *Rev. Agric. Cochabamba* 1949, **6**, No. 5, 3-19, bibl. 11, illus. [Harvard Univ., U.S.A.]

Authorized Spanish version by M. Cárdenas of *Bot. Mus. Leafl. Harvard Univ.* 1946, 12, No. 8.—G.M.R.

843 PINNELL, E. L. **Genetic and environmental factors affecting corn seed germination at low temperatures.** *Agron. J.* 1949, **41**, 562-8, bibl. 17. [Univ. Minnesota, St. Paul, Minn.]

844 ROSSMAN, E. C. **Freezing injury of inbred and hybrid maize seed.** *Agron. J.* 1949, **41**, 574-83, bibl. 12. [Iowa State Coll., Ames]

The effects of freezing temperature on seed viability and vigour were investigated. Tolerance was significantly related to hybrid vigour and to the physiological maturity of the lines, the more vigorous and more physiologically mature inbreds being less injured by freezing. The differences in physiological maturity between hybrid and selfed seeds may account for the greater freezing injury affecting viability of the hybrid seed. Further experiments revealed that as the moisture content of the seed dropped from 50 to 40 per cent, the tolerance of some lines increased more than others. The relationship of tolerance to seed size was not significant, and husk protection was of more value to some inbreds than others. In conclusion, it was established that the freezing tolerance of the seed is a combined attribute depending on genetic constitution, seed development and husk protection.—A.D.H.

845 STRAUGHAN, W. R. **The handling and storage of maize on the Atherton Tableland.** *Qd agric. J.* 1949, **68**, 311-26.

The article describes the system of controlling maize growing exercised by the Atherton Tableland Maize Marketing Board. Until recently harvesting was done almost entirely by hand but four types of mechanical harvester are now in use. These are described. The primary danger with mechanical picking lies in the inefficiency of the machine in removing the husk to allow of an efficient inspection of each cob. This results in dead grain reaching the storage silos. To obviate this a special separator has been designed and inserted into the line of grain travel on the top of the silos. Maize shelling at the silos costs 1s. 3d. per ton.—K.O.

846 GATTANI, M. L. **Control of secondary infection of downy mildew of maize.** *Curr. Sci.* 1950, **19**, 90, bibl. 2. [Indian Agric. Res. Inst., New Delhi]

Secondary infection of maize by *Sclerospora philippinensis* was controlled by spraying the crop with Bordeaux mixture.—K.O.

847 JOHNSON, A. G., ROBERT, A. L., and CASH, L. **Bacterial leaf blight and stalk rot of corn.** *J. agric. Res.* 1949, **78**, 719-31. [Bur. Pl. Ind., Agric. Res. Admin., U.S. Dept Agric.]

These diseases of maize have occurred sporadically in various Southern and Central States for the past 20 years. Inoculation experiments have shown that the disease may be readily induced on corn, wheat, rye, barley, oats, and *Setaria lutescens* by spraying the leaves with water suspensions of the bacterium. Light infections were obtained in the same way on *S. geniculata*, Honey sorgo and *Sorghum sudanense*. Stalk infection occurred when water suspensions of the organism were inoculated into the stalks of corn previous to tasselling.—S.D.

848 CHRISTENSEN, J. J., and SCHNEIDER, C. L. **European corn borer (*Pyrausta nubilalis* Hbn.) in relation to shank, stalk and ear rots of corn.** *Phytopathology* 1950, **40**, 284-91. [Minnesota Agric. Expt Sta.]

Stalk, shank and ear rots in Minnesota are commonly associated with injuries caused by the European corn borer. The borer provides a point of entry for fungi and weak pathogens, the movement of the larvae distributing the organisms inside the plant. Inbred lines of corn vary considerably in their susceptibility to stalk and ear rotting organisms, a fact which suggests the possibility of breeding for resistance to these rots.—P.J.B.

849 CONNECTICUT Agricultural Experiment Station. Circ. 164. **Control of the European corn borer by dusts and sprays.** By *N. Turner*. 1947, pp. 8.

SORGHUM

850 SOUTH DAKOTA Agricultural Experimental Station. Bull. 396. **Storing sorghum grains.** By *H. H. DeLong* and *E. I. Whitehead*. 1949, pp. 18.

851 KARPER, R. E. **Registration of sorghum varieties, V.** *Agron. J.* 1949, **41**, 536-40. [Agric. Expt Sta., Lubbock, Texas]

Fourteen new varieties, approved for registration, are described.—A.D.H.

852 SOUTH DAKOTA Agricultural Experiment Station. Bull. 397. **Norghum sorghum. An early combine grain sorghum.** By *C. J. Franzke*. 1949, pp. 4.

A new type of sorghum developed for conditions in South Dakota is described. It has an open panicle with a short stalk and can be combined easily. It germinates readily at low temperatures, is early maturing and has a consistently high grain yield. Two tables compare the agronomic and yield data of Norghum with those of four standard varieties of sorghum.—P.J.B.

853 MILES, L. G. **Sorghum growing in Queensland. (Including grain sorghums, sweet sorghums and Sudan grass.)** *Qd agric. J.* 1949, **69**, 187-213, and 249-65.

After general and historical accounts of the sorghum group, the author describes in detail the cultivation, production, diseases and pests of the grain sorghums, sweet sorghums and *Sorghum sudanense*. Illustrated descriptions are given of the varieties Wheatland, Kalo, Hegari, Early Kalo, Alpha, Capricorn, Coastland, Martin Caprock and Plainsman, all of the grain sorghum group, and the varieties Saccaline, Sugardrip, White African, Atlas, Italian and Honey, all sweet sorghums. The two varieties of Sudan grass described are Roma and Sweet Sudan.—K.O.

854 RAMAKRISHNAN, T. S. **Artificial infection of sorghum with long smut.** *Curr. Sci.* 1949, **18**, 418, bibl. 3.

Inoculation experiments, carried out on a field crop of Co. 11 strain of sorghum, prove that infection is through the young flower before ear emergence from the boot leaf.—K.O.

RICE

855 DOBELMANN, J. P. L'alluvionnement et le déracinement du riz dans les semis submergés. [**Alluviation and the uprooting of rice in submerged sowings.**] *Rev. Bot, appl.* 1950, **30**, 192-6. [Serv. Agric., Madagascar]

When rice is sown under water it frequently happens that the seedlings become uprooted. Sowing in dry land is undesirable because of weed growth. The following procedure is recommended. The field should be flooded to control weeds and then drained immediately before sowing. Germinated seed should be used, thus gaining 2 or 3 days. When rooting has begun, the field should be gradually submerged. Weed control with hormone herbicides appears to be successful.—E.B.

856 PORTÈRES, R. Le système de riziculture par franges univariétales et l'occupation des fonds par les riz flottants dans l'Ouest-africain. [**System of rice cultivation in strips of single varieties and employment of floating varieties in the lowest areas of West Africa.**] *Rev. Bot. appl.* 1949, **29**, 553-63.

Rice in West Africa is often grown on unlevelled soils, water being supplied by the rise of rivers or, in some places, by rainfall only. The system of planting several varieties, often five or six, in strips following the contour, is being extended. This practice is adapted to the variable conditions caused by a non-uniform water supply and is not to be confused with strip cropping for erosion control. There is wide scope for research into suitable varieties. Descriptions are given of cultivation in the Upper Niger, the Guinea coast, and other regions. The distribution of varieties is examined. Most varieties belong to *Oryza sativa*, imported from Asia. *O. glaberrima* was at one time grown in Guinea. This species has several floating varieties, with brown-red pericarp, but these have now been replaced to a great extent by varieties of *O. sativa*, mainly " Indochine flottant."—E.B.

857 VENKATANARASINGA RAO, M. B. **Pedigree seed of rice—its rapid extension in the country.** *Madras agric. J.* 1950, **37**, 33-8. [Agric. Res. Inst., Coimbatore]

The article gives an account of the method of production of pedigree rice seed in the U.S.A., Canada, Sweden and (in more detail) India.—K.O.

858 ARKANSAS Agricultural Experiment Station. Bull. 487. **Artificial drying of combined rice.** By *X. McNeal*. 1949, pp. 30, bibl. 9.

Samples of combined rice (usually of 12 lb.) were dried to 14 per cent moisture in two specially built experimental driers. Drying temperature, number of dryings and, in some cases, relative humidity and air pressure were varied. The varieties Zenith, Fortuna, Nira and Prelude were used. The following conclusions were drawn from the trials. In most cases the head rice yield per barrel (number of lb. of whole milled rice obtained from a barrel, 162 lb., of rough rice when milled) was increased as the number of dryings was increased from 1 to 4, at temperatures ranging from 100°F. to 150°F. At the lower temperatures of this range (100° to 110°F.) the increase in head rice yield was smaller than at the higher temperatures. In most cases the total drying time was reduced as the number of dryings was increased from 1 to 4 in the 100° to 150°F. temperature range, with a greater reduction at the lower than at the higher temperatures. The tempering period between dryings is important as it gives the grain moisture an opportunity to become uniform and reduces the drying time. Drying rice at temperatures above 130°F. reduced its germination percentage, though Nira was exceptional in still having a high germination percentage after drying at 140°F.—P.J.B.

859 KARUNAKAR, P. D., and RAJAGOPALAN, T. **Manuring of rice. Maintenance of soil fertility and increased production.** *Trop. Agriculturist* 1948, **104**, 210-4. [Dept Agric., Madras]

Recent work indicates that small applications of fertilizers in close proximity to the seed, and the pre-soaking of the seed in solutions of phosphates and other nutrients, may be effective in increasing the crop yield. The application of small doses of fertilizers at different stages of plant growth, instead of one larger application, was found to improve the yield and quality of the rice crop.—K.O.

860 RAJ, M. K. **Green leaf manuring and green manuring.** *Madras agric. J.* 1950, **37**, 3-6. [Dept Agric., Madras]

Green leaf manuring refers to the practice of lopping green leaves off trees such as Pungam and Neem and applying them to paddy fields, whereas green manuring is the term used for the growing and subsequent ploughing in of crops such as pillipesra (*Phaseolus trilobus*), daincha, sunnhemp (*Crotalaria juncea*), indigo and wild indigo (*Indigofera* spp.). Both practices have proved highly beneficial when applied to paddy fields and have resulted in increased rice yields. Factors governing green leaf manuring include the availablity of a suitable site for the trees, regular watering for them and the provision of guards to protect the trees from cattle during the first year of growth. The main problem in growing the green manure crop is that of irrigation, for in the drier areas, during the summer, all available water is needed for the other crops on the farm.—K.O.

861 RAO, C. H. **Manurial experiments on rice. 2. Effects of season and continuous green leaf manuring on yield.** *Madras agric. J.* 1950, **37**, 10-21, bibl. 4.

See *Soils and Fertilizers*

862 MUKHERJEE, S. K. **Mechanized rice cultivation in the U.S.A.** *Indian Fmg* 1949, **10**, 178-9.

The latest method of sowing rice seed and fertilizers in the U.S.A. is by aircraft, which fly about 10 feet above the flooded fields and liberate the seeds, or fertilizers, through special chutes into the 2 to 4 inches of water standing on the fields. A plane can sow seed or fertilizer at the rate of about 40 acres an hour. Better stands and better weed control is obtained by seeding directly into water than by sowing in dry land. Pernicious weeds can be controlled by spraying selective weed killers, such as 2,4-D from aircraft at the rate of two to three gallons per acre. Modern harvesting methods include the use of combines. The main factors which have contributed to high rice yields in the U.S.A. are improved seeds, better irrigation, liberal applications of fertilizer and rotation of crops.—T.D.H.

863 GODOY, C., Jr. Processos de colheita e batedura do arroz no Estado de São Paulo. [**Rice harvesting and threshing processes in the State of São Paulo.**] *Rev. Agric. Piracicaba* 1950, **25**, 23-36. [Luiz de Queiroz Agric. Coll., Piracicaba, São Paulo, Brazil]

Rice production in the Brazilian State of São Paulo almost doubled from 1944 to 1946, in which year it approached 16 million 60-kg. bags. The chief obstacle to a still greater expansion of the culture is the high cost of the manual labour incurred in harvesting and threshing. Threshing is sometimes done by machinery but few growers possess the necessary equipment. An account is given of tests comparing various manual and partly mechanical methods of harvesting and threshing carried out by the Luiz de Queiroz College. None was entirely satisfactory. A self-propelled combined harvester and thresher is being designed at the College.—G.M.R.

864 Padmanabhan, S. Y. **Occurrence of fungi inside rice kernels.** *Curr. Sci.* 1949, **18**, 442-3. [Cent. Rice Res. Inst., Cuttack-4, Orissa]

Study of the action of the fungicides Spergon and Phygon in preventing loss of viability in stored paddy seed has shown that apparently healthy seeds contain an internally borne fungus which may be cultured artificially. The method employed in culturing and the results obtained are described. *Trichoconis padwickii*—a weak pathogen of rice causing leaf and grain spot—occurred most frequently. *T. caudata* (Stack burn) was reported to be associated with deterioration of paddy seed in the stack. Other fungi identified were *Curvularia lunata*, *Ophiobolus miyabeanus*, *Helminthosporium oryzae*, and *Nigrospora oryzae*.—K.O.

865 Saran, A. B. **Some observations on an obscure disease of paddy**: *Oryza sativa*. *Curr. Sci.* 1949, **18**, 378-9. [Bihar Agric. Coll., Sabour]

The cause of an obscure paddy disease, rife in years of high flood, and known by the local names dakhina, ukra, chatra, etc. has not yet been ascertained. It is characterised by a yellowing of the leaves and a drying of their tips, which results in reduced yields and sometimes in complete loss of grain. Experiments carried out at Sabour indicate that a sulphate deficiency may be a contributary factor.—E.B.H.

LEGUMES

BEANS

866 Oliveira, A. J. de. Subsídios para o estudo de algumas formas cultivadas do Feijão vulgar. [**Contribution to the study of some cultivated forms of *Phaseolus vulgaris*.**] *Rev. Agron., Lisboa* 1943, **31**, 43-75, 1 pl. bibl. 41. [Received 1950]

Part of a dissertation is presented, in which the author discusses successively the literature, the economic importance of beans, cultural measures, and chemical composition. Finally, keys are presented for the identification of the spp. *Ph. vulgaris* and *Ph. coccineus* and the botanical varieties of *Ph. vulgaris*, by means of the characters of the seeds.—G.M.R.

867 Kendrick, J. B., and Middleton, J. T. **Gray mold of lima beans.** *Phytopathology* 1950, **40**, 228-34. [California Univ. Citrus Expt Sta., Riverside]

The paper reports field observations and experiments on grey mould disease of lima beans caused by *Botrytis cinerea*. The symptoms of the disease are described and the factors favouring it discussed. The following factors predispose to outbreaks of the disease: stage of maturity of plant, it being difficult to infect young actively growing parts of the plant, with the exception of the flower; humidity; foliage density; and the amount of *Botrytis*-contaminated extraneous organic material present. The importance of the last factor was demonstrated experimentally by the degree of infection initiated through the presence of alfalfa dust on plants. Experiments showed that bean blossoms were susceptible to *Botrytis* at all stages of maturity. Results indicated that with the exception of the flower, *Botrytis* is capable of invading only young and growing tissue when bean plants and other infected debris have accumulated under the plants. The dropping of infected flowers can lead to similar infection of other plant tissues. Control methods recommended emphasize the value of cultural practices rather than the use of fungicides. Satisfactory row spacing and late alternate-row irrigation seem effective in limiting disease outbreaks.—P.J.B.

868 Middleton, J. T., Stone, M. W., and Kendrick, J. B., Jr. **Incidence of lima bean root rot in soils treated with fumigants and insecticides for control of wireworms.** *Phytopathology* 1949, **39**, 813-21, bibl. 18.

The root rot under consideration is a complex involving the fungi *Fusarium solani f. phaseoli*, *Pythium ultimum*, *Rhizoctonia solani*, and *Thielaviopsis basicola*. Applications of soil fumigants and insecticides reduced the injury index of the beans. A relationship was found to exist between the number of wireworms in the soil and the injury index for root rot, but in general the number of wireworms decreases more rapidly with treatment than does the injury index.—T.D.H.

869 Yarwood, C. E. **Effect of soil moisture and mineral nutrient concentration on the development of bean powdery mildew.** *Phytopathology* 1949, **39**, 780-8, bibl. 11, illus.

It is demonstrated that infection with *Erysiphe polygoni* depresses the green weight of infected bean leaves to a greater extent at high soil moisture contents than at low moisture contents in comparison with healthy leaves. [See also *Rev. appl. Mycol.*]—T.D.H.

870 UNITED STATES Department of Agriculture, Bureau of Entomology and Plant Quarantine. ET-279. **A device for spraying bean seed in the row while planting.** By *J. C. Elmore.* 1950, pp. 3.

The paper gives illustrated constructional details of an attachment for spraying lima beans and the surrounding soil with an insecticide as part of the planting operation.—P.J.B.

PEAS

871 ROEDIGER, W. V. **Peas as a rotation crop in the better rainfall areas.** *J. Dep. Agric. S. Aust.* 1949, **53**, 129-30.

The author shows how, by the use of peas, virgin country can be brought into production rapidly. Land that is cereal-sick, particularly from wheat, can be speedily rejuvenated by one crop of peas. Soil inoculation, time of sowing, varieties and harvesting are discussed.—K.O.

872 VASUDEVA, R. S., and ROY, T. C. **The effect of associated soil microflora on *Fusarium udum* Butl., the fungus causing wilt of pigeon-pea (*Cajanus cajan* (L.) Millsp.)** *Ann. appl. Biol.* 1950, **37**, 169-78, bibl. 23. [Indian Agric. Res. Inst., New Delhi]

873 JANCKE, O. Bekämpfung des Erbsenkäfers (*Bruchus pisorum* L.). [**Control of the pea beetle (*Bruchus pisorum* L.)**] *NachrBl. dtsch. PflSchDienst* 1948, **2**, 186-7, bibl. 15. [Neustadt/Haardt]

SOYBEANS

874 TILT, J. **Soybean trials in Tasmania.** *Tasm. J. agric.* 1949, **20**, 163-6.

Temperature and rainfall data for Tasmania differ considerably from those of the main soybean-producing countries. Experiments undertaken at the Cressy Research Farm have proved that even in the most favourable districts the yields have not been high. In view of the present high prices offered for blue and grey peas, there is little justification for extensive soybean production, although it is recommended that research on new varieties, more suitable to the Tasmanian climate, be continued.—E.B.H.

875 OHIO Agricultural Experiment Station. Spec. Circ. 79. **Monroe. A pre-wheat soybean variety for northern Ohio.** By *L. C. Saboe.* 1949, pp. 7.

Monroe was developed for early-maturing qualities from crosses between the varieties Mukden and Mandarin. A table summarizes 6 years comparative data of the agronomic and chemical characteristics of Monroe and Earlyana.—P.J.B.

876 OWEN, C. **New Canadian variety** [**of soybean**]. *Soybean Digest* 1949, **9**, 8.

A new soybean variety, Harly, has been bred at the Dominion Experimental Station, Harrow, from a cross between Mandarin and A.K. (Harrow). It is earlier than both parents, is superior to Mandarin in yield and stands 12 in. higher. Its height and stem strength make it suitable for combine harvesting.—E.B.H.

877 SINGH, M. P., and ANDERSON, J. C. **Inheritance of earliness of maturity in soybean, *Glycine max* (L.) Merrill.** *Agron. J.* 1949, **41**, 477-82. [Rutgers Univ., New Jersey Agric. Expt Sta.]

The purposes of these experiments on soybeans were (a) to get an estimate of the number of factors involved in the earliness of maturity, (b) to study the nature of the action of genes and their dominance relationships, and (c) to determine the extent to which date of planting induces variability in the maturity of soybean.—S.D.

ROOT CROPS

MISCELLANEOUS

878 HOVD, A. Ny melding fra det norske myrselskaps forsøksstasjon på Mæresmyra. Forsøk med rotvekster på Mæresmyra. [**Recent report from the Norwegian Bog Society's experiment station on Maeresmyra. Trials with root crops on Maeresmyra.**] *Medd. norske Myrselsk.* 1948, **46**, 75-6.

In a trial with twenty varieties of turnips which was carried out on old, well humified grass bog, liberally manured (specified in text), results are reported relating to four varieties: Dales Hybrid, Fynsk Bortfelder, Østersundom and Kvit Mainepe. With the manuring specified Østersundom (Danish strain) gave the largest yield of roots per dekar, 8290 kg. (or 610 fodder units) on the average during the experimental period. Kvit Mainepe (Forus) gave the largest yield calculated in fodder units: a root yield of 5737 kg. which corresponds to 615 f.u. Including the yield of tops, Kvit Mainepe (Forus) and Fynsk Bortfelder (Grimstad) are equal with respectively 814 and 812 f.u. per dekar. In a variety trial with turnips (varieties Fynsk Bortfelder and Kvit Mainepe) on sphagnum peat (manuring as on the trial on grass bog) the yields in f.u. were approximately one-third less, but the percentage of dry matter was higher. Swedes and beets (fodder beets and fodder sugar beets) have given small yields on grass bogs. Bog soils are not suitable for these warmth-loving plants and even after sowing in frames and transplanting there are some "bolters." Bolting in root crops is not due primarily to a low soil temperature during sowing: atmospheric temperature in the second and third week after sowing is of greater significance.—R.P.J.

879 TEMPLEMAN, W. G., and WRIGHT, J. O. **Weed control in root crops by pre-sowing applications of iso-propylphenylcarbamate and mixtures of that substance and 'Methoxone' or 2,4-dichlorophenoxyacetic acid.** *Nature, Lond.* 1950, **165**, 570-1. [I.C.I., Ltd., Jealott's Hill Res. Sta., Bracknell, Berks.]
Preliminary trials only.—M.H.

SUGAR BEET

880 UTAH-IDAHO CULTIVATOR. **The sugar-beet is not the robber of soil fertility.** *U. I. Cultivator* 1949, **9**, 17.
This article points out why sugar beets take up a smaller amount of important elements from the soil, compared with other crops. They use up relatively little nitrogen, phosphoric acid and potash. On a comparative basis 15 tons of sugar beet take about 145 lb. of potash, 115 lb. nitrogen, and 45 lb. of phosphoric acid. These figures are compared with alfalfa. The amount of plant food that is taken out of the soil annually by alfalfa, celery, lespedeza, soybeans, sugar beet, wheat, corn and clover is shown in the form of a table based on the "Plant-Food Utilization" chart published by the American Potash Institute.—S.D.

881 ALDROVANDI, A. Il seme monogerme di barbabietola. [**The single-germ seed of beet.**] *Industr. saccar. ital.* 1949, **42**, 245-51.
A general account is given of the research carried out in various countries for obtaining single-germ seeds. Because of abundant labour in Italy, the production of this type of seed by means of expensive mechanical processes is unnecessary. In view of the possibility that single-germ seeds could eventually be produced genetically, trials were carried out during the last three years by the Institute of Agronomy of the Bologna University to determine whether this seed shows advantages over the usual seed. In all the trials the single-germ seeds gave a poor performance, resulting in lower yield. It was found that the shoots from single-germ seeds have not sufficient strength to pierce a hard soil crust, such as one frequently finds in Italian soils. Because of this, the author considers that single-germ beet seed is unsuitable for Italy.—E.B.

882 GASSLANDER, C. H. Odling av sockerbetsfrö. [**Production of sugar beet seed.**] *Svensk Frötidn.* 1949, **18**, 171-2.
Sweden's initial sugar beet cultivation was based on imported seed, most of which was obtained from Germany. The first Swedish-produced seed was harvested in 1909. The quantity in that year was only 10,000 kg. In 1913 it was 273,000 kg. From 1913 to 1920 the area devoted to seed production of sugar beet increased by approximately 400 per cent and the number of growers by 330 per cent. During the depression in the early years of the nineteen-twenties there was a decrease in this cultivation, and approximately 25 per cent of the seed was imported. After 1926 interest in the crop revived and importation became unnecessary.

One of the most serious difficulties to be overcome has been the planting of the stecklings in the spring. A machine—the GePe—has recently been placed on the market and has proved very effective: it was widely used in 1948. Another problem is the control of aphids. A mechanical sprayer has recently been invented for spraying the plants with nicotine solution. It can be employed on the seed field without injury to the plants, and enables approximately 10 ha. to be sprayed in a day.—R.P.J.

883 SALT LAKE CITY, Utah-Idaho Sugar Company. **Decorticated sugar beet seed.** pp. 23. [**n.d.**]
Decorticated sugar beet seed is whole seed which has been processed to remove some of the germs from the larger seed balls as well as most of the loose, fluffy, corky material from all the seed balls. The processed seed is then sized to bring it within the range 8/64th in. to 11/64th in. Decorticated seed is thus a compromise between whole seed and "7-9" sheared seed which has been in use for several years. Decorticated seed has advantages over both these extremes, having more true seeds to the pound than whole seed as well as being better insured against adverse soil conditions than "7-9" sheared since it averages more sprouts per seed. Farmers are recommended to sow this new processed seed, in preference to "7-9" sheared seed, as it provides all the benefits inherent in sheared seed without sacrificing good germination stands.—T.D.H.

884 MONTANA Agricultural Experiment Station. Paper No. 201. (Journ. Ser.) **Effect of fertilizers on diseases and yield of sugar beets planted in depleted soil.** By *M. M. Afanasiev.* [**n.d.**] pp. 6. [Montana State College]
The study was undertaken at Huntley Branch Station, Huntley, Montana, during 1941-44. Nitrogenous fertilizers (N), phosphate (P) and manure

(M) were used. Plots treated with P, PN, PM and PNM had the lowest percentage of tops and the highest percentage of roots while those fertilized with N only, gave opposite results. The top-to-root ratio was more uniform in 1945 when complete fertilizers were applied. Sugar beets showed a proportional effect to the different nutrients as measured by yield, stand, seedling disease and top-to-root ratio and ability to respond quickly to increased soil fertility.—E.B.H.

885 Nelson, R. T. *et al.* **Harvest results of inorganic fertilizer tests on sugar beets conducted in four States, 1947.** pp. 14. [**n.d.**]

The results are given for the States of Colorado, Nebraska, Wyoming and Montana, but in describing materials and methods, generalizations are made where possible. It is concluded that (a) indiscriminate use of N fertilizer on fields, even at moderate rates, rapidly minimizes (through reduction in sugar percentage) the effectiveness of certain moderate gains made in yield of roots; (b) gross sugar production could be improved by the use of nitrogen; (c) phosphatic fertilizers are beneficial; (d) potassium is needed for the soils of Nebraska and Colorado; (e) no beneficial response to the minor elements Fe, Mn, Cu, Zn was observed in Colorado and Wyoming, though results were slightly better in Montana; (f) the side-dressing equipment may cause damage and affect yield.—S.D.

886 Decoux, L. Comment assurer la récolte inversée de la betterave sucrière ? [**Reverse harvesting of the sugar beet.**] *Publ. Inst. belge Amélior. Better.* 1949, **17**, 89-117. [Inst. Belge pour l'Amélioration de la Betterave, Tirlemont]

The normal method of harvesting sugar beet is to uproot the whole plant, then to cut off the green tops. In the reverse method of harvesting, the tops are first cut off and collected before the roots are pulled up. This can be carried out by hand, by machinery, or by a combination of the two: all three methods are described and the advantages and disadvantages of each enumerated.

For Belgian conditions small beet harvesters have proved best. They do not damage the tops and they are less costly. Buyers of sugar beet often make it a condition of purchase that the tops should not be removed because this reduces the sugar content of the root.—D.B.

887 Decoux, L. La dosseuse niveleuse, en relation avec la préparation superficielle du sol. Essais préliminaires. [**The leveller, in relation to the surface cultivation of the soil. Preliminary trials.**] *Publ. Inst. belge Amélior. Better.* 1949, **17**, 67-88. [Inst. Belge pour l'Amélioration de la Betterave, Tirlemont]

For early sowing of beet the method of tillage consists in autumn application of manure followed by ploughing and a spring superficial cultivaton of the soil. This last operation is carried out with a machine which could be described as a harrow-leveller. (The American equivalent is "soil surgeon,") Several such implements and their action on the soil are described.—D.B.

888 Decoux, L. La mécanisation de la culture de la betterave en 1948. Nouveaux progrès. [**Progress in the mechanization of beet cultivation in 1948.**] *Publ. Inst. belge Amélior. Better.* 1949, **17**, 119-47. [Inst. Belge pour l'Amélioration de la Betterave, Tirlemont]

The experiments instituted in 1946 have resulted in considerable progress. The machines in use in several western European countries for manure spreading, sowing, hoeing, thinning, harvesting, collecting and transporting the crop are described and illustrated.—D.B.

889 Farm Implement and Machinery Review. **The Silk sugar beet topper and collector.** *Fm Impl. Mach. Rev.* 1949, **75**, 762-3.

This machine is designed to precede the Birtley-Silk sugar beet lifter and cleaner (see *Fm Imp. Mach. Rev.* Nov. 1, 1945, p. 560) and does away with the hand topping gang that was necessary to clear the rows, with topping hoes, preparatory to working the lifter. A light tractor draws the topper, followed by a trailer, into which the sugar beet crowns are collected. The unit requires two men, the tractor driver and the operator on the topper. It travels at about 2.5 miles per hour and can pass through a 9 ft. gateway. The machine is easily handled and the tops are gathered unsoiled and without any waste of crown.—T.D.H.

890 Peterborough, British Sugar Corporation. **Report on mechanization of the sugar beet crop in Great Britain during the year 1948.** 1949, pp. 20.

The main conclusion is that 1948 was a year of substantial progress. Mechanical harvesting has emerged as a sound economic proposition. About 12 per cent of sugar beet producers, growing approximately 25 per cent of the acreage, used self-propelled or tractor-drawn drills. The scope for new machines of the right type appears to be great. Research is proceeding on the mechanical singling of beet. There has been a considerable increase in the spreading of salt by contract. One in four harvesters in use is owned by farmers, whose sugar beet crops vary in size from 10 to 25 acres. About one-fifth of the acreage harvested by machine was undertaken by contractors. The need for specialized machinery and for research into the problems of mechanizing under varying conditions is stressed. —T.G.J.

891 MONTANA Agricultural Experiment Station. Paper No. 202 (Journ. Ser.) **Effect of seed treatments on seedling diseases of beets planted in the greenhouse in highly infested soil.** By *M. M. Afanasiev.* [**n.d.**] pp. 3.

New improved Ceresan, Ceresan Yellow cuprocide, Phygon, Arasan, Copper trichlorphenate and Chloranil were used in different combinations for treating sheared sugar beet in two experiments. The seed used was treated U.S. 215 × 216, with Arizona 59 as the control in the first experiment, and untreated U.S. 215 × 216 as the control in the second. It is concluded that any fertilizer which produces vigorous, fast-growing beets is more important than seed treatment for control of beet seedling disease.—E.B.H.

BRASSICA

892 HASLER, A., and MAURIZIO, A. Die Wirkung von Bor auf Samenansatz und Nektarsekretion bei Raps (*Brassica napus* L.) [**The action of boron on seed setting and nectar excretion in rape (*Brassica napus* L.)**] *Phytopath. Z.* [**n.d.**] **15**, 193-207, bibl. 31. [Agric. Chem. Inst. and Dairy Research Station, Liebefeld-Bern, Switzerland]

Failure to set seed is a common occurrence in crucifers. It occurs in pollinated, apparently normal, flowers and is associated with boron deficiency which in turn is associated with a distinct alkaline reaction, or an excess of calcium carbonate, in the soil. Pot experiments on *B. napus* gave the following results. Boron is essential for seed setting, and it is the pollinated plant not the pollen-bearing plant for which the boron is essential. Boron has no effect on the amount of nectar or its sugar concentration. A reduction of the sugar concentration with an increase in the amount of nectar has been observed.—D.B.

893 LEGGATT, C. W., and INGALLS, R. A. **Size of seed in relation to size and shape of root in swede turnips.** *Sci. Agric.* 1949, **29**, 357-69. [Seed Res. Lab., Div. Plant Products, Dept Agric., Ottawa (C.W.L.) and Div. Plant Products, Dept Agric., Saskatoon, Saskatchewan (R.A.I.)]

Seed of the Laurentian variety was screened into five fractions of different mean sizes which were tested in the laboratory for germination rate and capacity, and in the field for yield, shape and uniformity of roots. Seeds of small size were in the above features generally similar to seeds of large size, but failed to give as good a stand in some field plots. Roots produced by the smallest size of seed tended to be flatter in shape than those produced by the larger sizes, but did not differ significantly from the latter in mean size nor in uniformity of size. Owing to the difference in shape of the roots produced by seeds of the smaller sizes and failure of such seed to become satisfactorily established in the field, it is recommended that the smallest size group be removed from seed stock.—Adapted authors' summary.

894 BEHR, L., and EICHLER, W. Kahlfrass an Senf durch die Rübenblattwespe (*Athalia colibri*). [**Defoliation of mustard by the turnip sawfly (*Athalia colibri*).**] *NachrBl. dtsch. PflSchDienst* 1948, **2**, 3-5, bibl. 6. [Biol. Inst. Agric. and Forestry, Substation Aschersleben]

895 BORGES, Maria de Lourdes V. O virus do mosaico amarelo do nabo. [**The yellow mosaic virus of the turnip.**] *Agron. lusit.* 1947, **9**, 253-64, [English summary, p. 262], 2 pls., bibl. 14. [Est. Agron. Nac., Sacavém, Portugal]

A virus affecting *Brassica napus* L. is studied and symptoms in the following species are described: *Brassica napus*, *B. chinensis*, *Raphanus sativus*, *R. raphanistrum*, *Cheiranthus cheiri*, *Malcolmia maritima* etc. The virus is possibly identifiable with the turnip yellow mosaic virus Markham and Smith (*Nature*, 1946, 157, 300-1).—From author's summary.

896 GODAN, Dora. Über Prognosestellungen, betreffend Massenvermehrungen von Raps- und Rubsenschädlingen. [**The position regarding prognosis of increase of pests of rape and turnip.**] *NachrBl. dtsch. PflSchDienst* 1948, **2**, 148-52, bibl. 15. [Berlin-Dahlem]

897 HÄRDTL, H. Die Bekämpfung der Rübsenblattwespe. [**Control of turnip-leaf wasp (*Athalia spinarum*)**] *NachrBl. dtsch. PflSchDienst* 1948, **2**, 182, bibl. 5.

898 HARLE, A. Ist der Rapsglanzkäfer (*Meligethes aeneus* Fabr.) nur ein Schädling? [**Is the rape beetle (*Meligethes aeneus* Fabr.) a pest only**?] *NachrBl. dtsch. PflSchDienst* 1948, **2**, 40-2, bibl. 14. [Landesstelle für Naturschutz, Tübingen]

The insect contributes so little to pollination of rape and turnip that it is in no way essential for seed setting. Pollination is done much more efficiently by bees. There is no case for the preservation of this insect, or for relaxing control measures.—D.B.

OIL CROPS

MISCELLANEOUS

899 SVENSK FRÖTIDNING. Sveriges Oljeväxtodlares Centralförenings verksamhet 1948. [**The work of the Association of Swedish Oil-crop Growers in 1948.**] *Svensk Frötidn.* 1949, **18**, 151-4.

The Association's members comprise thirteen growers' societies. In 1940 the area under oil crops in Sweden was 400 ha. and the number of growers 250 : in 1948 the corresponding figures were 78,700 and 15,150. Autumn-sown oil crops overwintered well. Development in the spring was good and attack by pests less severe than in the previous year. According to preliminary computation, average yields were: autumn rape 2150 kg.; autumn "rybs" (*Brassica rapa oleifera*) 1020 kg., spring rape 1170 kg., white mustard 1130 kg. and oil flax 1470 kg. per ha.—R.P.J.

900 SCHWARZE, P. Methoden zur Ölbestimmung in der Pflanzenzüchtung. [**Methods for the determination of oil in plant breeding.**] *Z. Pflanzenz.* n.d. **28**, 23-43. [Erwin-Baur-Inst. für Züchtungsforschung, Voldagsen]

901 RHEINWALD, H., and JESSEN, W. Stickstoffdüngungsversuche zu Mohn. [**Nitrogen manuring trials with poppy.**] *Z. PflErnähr. Düng.* 1949, **46**, 190-5, bibl. 9. [Agric. Expt Sta., Kassel-Harleshausen]

902 GARBER, K. Über den Anbau von *Conringia orientalis* (L.) Andrz. (Dum.) als Ölpflanze. [**Cultivation of *Conringia orientalis* as oil plant.**] *Bot. oecon.* 1948, **1**, 38-48. [Staatsinst. Angewandte Botanik, Hamburg]

In 1939, this crucifer was recommended for cultivation as an oil-bearing plant in Russia. The six species of *Conringia* originated in eastern Mediterranean countries and have spread throughout Europe and North Africa. *C. orientalis* is an annual which grows to a height of 50-60 cm., flowers in mid-June and ripens in mid-August. When sown at the rate of 20 kg. per ha. in rows 25 cm. apart, there was an average seed yield of 7 kg. per ha. with an oil content of 28.5 per cent and crude protein content of 22.6 per cent. A trial with seed selected for high oil-content produced 36 per cent oil. The oil is light-yellow in colour, non-drying and edible. Although *C. orientalis* has advantages over some other oil-bearing plants (e.g. *Brassica napus* and *B. rapa*), in that it is not attacked by the ground flea, its yield under German conditions is considered to be too low. Breeding for high yielding varieties must precede any recommendation for its cultivation as an oil plant.—D.B.

903 SAG, G. Culture du carthame dans la région Girondine. (Note préliminaire). [**Safflower cultivation in the Gironde region, France. (Preliminary note).**] *Rev. Bot. appl.* 1950, **30**, 216-22, bibl. 16.

The characteristics of *Carthamus tinctorius* and its cultivation are reviewed. Experiments with the crops were carried out in 1948 and 1949. Two varieties were acclimatized and gave yields of 17.5 and 20q. of grain per ha. respectively. A third variety, originating in Morocco, failed. The author believes that insufficient potassium in the soil has an unfavourable influence on the oil-content of the seed. Further trials will be carried out to ascertain the influence of soil elements on yield and oil content. —E.B.

904 MONTANARI, V. La coltura dell'olivo e delle piante oleaginose nelle Venezie. [**Cultivation of olive and oil crops in the Venetian region.**] *Agricoltura Venezie* 1948, **2**, 389-402.

The olive can be grown in only a few zones of the Venetian region as here it is at its northern limit of cultivation. The cultivation of oil crops (mainly colza, groundnuts, sunflower, soybean and castor) developed during wartime, but has gradually decreased so the oil crops now occupy 1.3 per cent only of the total arable area. Groundnuts are now the most profitable of these crops. Some rape is grown. It is thought that much oil could be obtained from tobacco seed. Tobacco cultivation is extending.—E.B.

905 SPRAGUE, G. F., and BRIMHALL, B. **Relative effectiveness of two systems of selection for the oil content of the corn kernel.** *Agron. J.* 1950, **42**, 83-8, bibl. 13. [Iowa Agric. Expt Sta., Ames]

The paper deals mainly with the relative efficiency of recurrent selection and selection during inbreeding as reflected in the oil content of maize. In experiments on Illinois High Oil × wx0s420 series, two cycles of recurrent selection led to a mean rise in oil content from 7.2 to 10.5 per cent.—P.J.B.

BRASSICA

906 JESSEN, W. Die Wirkung der Phosphorsäuredüngung bei verschiedenen Aussaatzeiten von Sommerraps. [**The effect of phosphoric acid manure on summer rape when sown at different times.**] *Z. PflErnähr. Düng.* 1949, **47**, 161-4, bibl. 6. [Agric. Expt Sta., Kassel-Harleshausen, Germany]

Early sowing was superior to late sowing in that yield and oil content were higher. Increase in the amount of phosphoric acid apparently had no effect on yield or oil content.—D.B.

907 TRUNINGER, E. Über den Rapsanbau in der Schweiz und seine Bedeutung für die inländische Fettversorgung während der Kriegsjahre 1941-1947. [**Cultivation of rape in Switzerland and its importance for maintaining supplies of fats during the war years 1941-1947.**] *Landw. Jb. Schweiz* 1949, **63**, 513-42. [Bern]

This article provides a record, for the benefit of future generations, of the cultivation, harvesting, seed delivery and seed processing of this crop in wartime. The author was the expert on edible fats and oils in the wartime Ministry of Nutrition. As supplies of vegetable fats from external sources ceased, provision had to be made for their production within Switzerland. Rape (*Brassica napus oleifera*) was chosen as the most suitable oil-bearing crop, largely because it could be harvested in time to leave the land free for a catch crop. In 1942, the compulsory area for rape cultivation was only 600 ha., but by 1946 it had increased to 6000 ha. The present policy is not to abandon rape cultivation but to maintain a certain area if only to keep the technique alive.—D.B.

908 VALLE, O. Höstrybsen, vår nya oljeväxt. [**Autumn "rybs" (*Brassica rapa oleifera*) Finland's new oil plant.**] *Tidskr. Lantm.* 1949, **31**, 170-4.

In Finland oil crops have been grown only during the last 10 years. In 1949, oil flax and fibre oil flax were grown on 5269 ha. Experiments at Dickursby indicate that autumn "rybs" should be sown at the end of July to the beginning of August. It is of great importance for the overwintering of this plant that the ground should be well drained. Manuring should be liberal: in addition to farmyard manure 300 to 400 kg. superphosphate and 150 to 200 kg. potash salts per ha. should be applied. Hitherto only two varieties have been tested at Dickursby, the German variety Gruber and Svalöf Rapido: differences in winter hardiness and yield have been slight but Rapido has considerably stiffer straw. Sowing is carried out in drills. The rate of seeding varies from 5 kg. on fallow to 8 kg. on broken-up ley. The seed ripens at the beginning of July: it sheds readily. The average yield is computed at 1500 kg. per ha. seed or approximately 600 kg. oil per ha. Owing to its early ripening and resistance to frost, the cultivation of this new oil crop is extensive.—R.P.J.

909 LORENSSON, A. Höstoljeväxternas övervintring. [**Overwintering of autumn oil crops.**] *Svensk Frötidn.* 1949, **18**, 154-6.

The general opinion appears to be that autumn "rybs" (*Brassica rapa oleifera*) is considerably more winter hardy than autumn rape. On the other hand autumn "rybs" has proved particularly tolerant of late sowing, unlike autumn rape. A suitable time for sowing autumn rape on Gotland is the first half of August, with the 20th as the final date. The further north the crop is grown the earlier must it be sown. Autumn "rybs" on Gotland is sown about a fortnight after autumn rape. Three varieties of autumn rape are mentioned: Svalöf late, Lembke autumn (considered the more winter hardy) and a new Svalöf variety, Matador, derived from Lembke. Matador does not give a high seed yield but its oil content is high. The oil crop collection includes a variety of Baltic origin which possesses good winter hardiness and so should be of interest for mid-Sweden. Only one variety of autumn "rybs" is available on the market, Rapido. Another, Lembke's autumn is reported to give a considerably larger yield than Rapido. Lembke's autumn "rybs" is derived from a cross between rape and "rybs" and should be regarded as a rape variety rather than as "rybs". On Gotland, to ensure normal winter hardiness, 400 kg. phosphatic and 200 kg. potash fertilizers are applied per ha., even where farmyard manure is given. Nitrogenous fertilizers do not improve winter hardiness and are applied, preferably in the spring, at 600 to 800 kg. per ha.—R.P.J.

910 LAURENT, J. F. La culture du colza au Kivu (Kabare). [**Colza cultivation at Kivu (Kabare, Belgian Congo).**] *Bull. agric. Congo belge* 1950, **41**, 69-72.

Experiments with *Brassica campestris* var. *oleifera* (type undetermined) have been carried out over a period of 4 years. It can be grown during the wet or dry seasons by sowing in September or February, respectively. Its growing period is 4.5 months. Aphids, which attack the crop in July can be destroyed by a soap and paraffin emulsion spray. Cultural methods are explained. Average yields of 2500 kg. of seed per ha. are obtainable on good soils, in a crop rotation in which farmyard and green manure are used. Trials are continuing, using spring colza, winter colza, and Hamburg dwarf winter colza.—E.B.

SUNFLOWER

911 STOJKOVIĆ, L., and GIBŠMAN, E. Selekcija suncokreta. [**Sunflower breeding.**] *Radovi pol. nauc.-istr. Ustanova.* [*Contr. agric. Inst. Sci. Res.*] 1949, **1**, 3-10, [Russian summary, p. 10]. [Agric. Sci. Res. Inst., Belgrade]

In 1945 the above Institute began work to produce types of *Helianthus annuus* with high oil content. Varieties 4 and 8 are described.—M.H.

912 Turmel, J. M., and Belval, H. Un cas d'hybridation spontanée entre *Helianthus* vivaces. [**A case of spontaneous hybridization in perennial *Helianthus*.**] *Bull. Mus. Nat. Hist. Paris*. 1947, **19**, 217-23.

913 Curteis, W. M. **Sunflowers as a seed crop.** *Agric. Gaz. N.S.W.* 1949, **60**, 563-4, 604, illus.

Uses, climatic and soil requirements, fertilizers, soil preparations, and harvesting are briefly dealt with. Of the varieties grown, Sunrise has proved the most satisfactory for header-harvesting because of its dwarf habit and early maturity ; Advance Hybrid gives higher yields, has larger heads and a higher oil percentage. Giant or Mammoth Russian, though high yielding, is too tall for header-harvesting. Mennonite, though grown in Queensland, is unpopular because it lacks uniformity.—S.D.

LINSEED

914 Wilson, A. S. B., and others. **Linseed trials, 1948. East, West and North of Scotland.** *Scot. J. Agric.* 1948-9, **28**, 150-5.

Results of the trials showed that Redwing was the most suitable linseed variety in all cases. Trials in the east showed that Dutch White, Liral Crown and Liral Monarch were unsuitable for seed production. In the north, Dutch White Flowered, English Blue Flowered, Royal, Bison, Indian and Plate were too slow to mature. In the west, Royal did not give such good results as Redwing. Suggestions are given for weed eradication, cultivation, manuring, harvesting, etc.—S.D.

915 Curteis, W. M. **The growing of linseed made possible by disease resistant varieties and effective pest control.** *Agric. Gaz. N.S.W.* 1949, **60**, 283-7.

The introduction of new disease-resistant varieties, in particular the American variety Walsh, has made commercial linseed growing possible in Australia. The crop is sown in April/May, flowers in September and is harvested in December. It may be grown under any conditions likely to grow good wheat crops and can be irrigated in dry areas. Seed rates vary from 28 to 40 lb. per acre, and depth of sowing from 1 to 1.5 in. ; the standard fertilizer is superphosphate 0.5 to 1 cwt. per acre, drilled with the seed. Wheat or rice headers can be used for harvesting linseed, if suitably adjusted. A yield of 10 bushels per acre may be expected. Caterpillars of the moth *Heliothis armigera* which attack the seed capsules can be controlled by DDT dust. Rust (*Melampsora lini*) does not attack the new variety Walsh in New South Wales, but Pasmo disease (*Septoria linicola*) has been reported to attack it.—J.L.

916 Försök och Forskning. Nytt skadedjur på lin. [**New pest of flax.**] *Försök och Forskning*. 1949, **6**, 70.

The Swedish Plant Protection Institute has received from Gotland a sample of flax seed capsules damaged by a caterpillar. The pest has not been observed in Sweden before. It appears to be the larva of *Phalonia* (*Conchylis*) *epilinana*, which has long been known in Russia and Germany as a seed pest of both oil and fibre flax.—R.P.J.

917 Butler, F. C. **Pasmo disease of linseed.** *Agric. Gaz. N.S.W.* 1949, **60**, 291-3.

This seed-borne disease, caused by *Septoria linicola*, was first recorded in New South Wales in 1948. It is most serious in the seedling stage and after flowering and may cause great damage with loss of yield. Its symptoms are described. Control measures are given.—J.L.

GROUNDNUT

918 Jacques-Felix, H. Pour une enquête sur le voandzou (*Voandzeia subterranea* Thou.). [**Investigation on Bambara groundnut *Voandzeia subterranea* Thou.).**] *Agron. trop.* 1950, **5**, 62-73, bibl. 45.

Information is given on the geographic and phylogenetic origin of this plant, its biology and anatomical features. The author is making a special study of this species and wishes to form a complete collection of varieties. He requests that dry plants, fruits and seeds be sent to the following address : " Sect. bot. du Lab. d'Amélioration des Plantes, 45 bis, Avenue de la Belle-Gabrielle, Nogent-sur-Marne (Seine), France." Details are specified.—E.B.

919 Bouffil, F., and Tourte, R. Essais d'écimage de l'arachide effectué à la station de M'Bambey. [**Groundnut topping trials at M'Bambey 1948.**] *Agron. Trop.* 1949, **4**, 486-92.

The lateral stems of *Arachis hypogaea* bear more flowers than the central stem and experiments have been made to cut out the apparently useless central stem. Contrary to expectation, results showed a 6.2 per cent decrease in the pod weight and a 12.6 per cent decrease in the haulm weight of the topped groundnuts compared with the untreated plants. Experiments are still in progress.—E.B.H.

920 Bouffil, F. Étude de l'absorption de l'eau par la graine d'arachide. [**Study on water absorption by groundnut seed.**] *Agron. trop.* 1950, **5**, 74-81.

Unsatisfactory germination is believed to be caused by lack of water. If conditions for rapid development are not present, the seed quickly degenerates. Laboratory trials indicate that water absorption is high during the first hours of soaking and that it is practically nil after 12 hours. Soaking prolonged even for 36 hours does not diminish germination capacity. Soil tests involved irrigation and presoaking the seed for 12 to 60 hours. Higher yields than in the control were obtained by soaking for 12 and 24 hours. The highest yield and greatest number of pods were obtained with 24 hours' soaking. Longer treatments resulted in yield lower than that of the control. The trials are being continued. —E.B.

921 RODRIGO, P. A. **Peanut culture in the Philippines.** *Philipp. J. Agric.* 1949, **14**, 165-80, bibl. 13, illus. 4. [Bur. Plant Industry, Manila]

After a brief history, the author describes the climatic and soil requirements of this crop, as well as its cultivation and harvesting. Some varieties are named. The picking and shelling of the pods are expensive operations if done by hand and are the factors limiting large scale production. Descriptions of the diseases and pests and the commercial uses of the crop are given.—K.O.

922 BOUFFIL, F., and SAUGER, L. Première classification des variétés d'arachides de la collection de M'Bambey. [**First classification of groundnut varieties in the M'Bambey collection.**] *Agron. Trop.* 1949, **4**, 493-502.

The classification of the twenty-three varieties of *Arachis hypogaea* in the collection is based only on the vegetative cycle, pellicle colouring and pod formation. The early varieties are erect and fall into seven types; the late varieties consist of seven semi-erect and nine prostrate types. The same pod formation is often found in these two groups. A fixed classification is not made because the varietal names have not been universally standardized. As the M'Bambey collection increases a new classification will have to be formed.—E.B.H.

923 SAUGER, L. Les améliorations obtenues á la station de M'Bambey par la sélection de l'arachide. [**Improvements in groundnut selection made at the M'Bambey Experiment Station.**] *Agron. Trop.* 1949, **4**, 502-7.

Several pure groundnut strains bred at M'Bambey are well adapted to their environment. Their pods are more numerous, richer in oil and perfectly regular in form. Two pure strains, 24.11 and 30.86, are compared with an unimproved strain and the results tabulated. The improved strains show a pod number increase of 21 per cent and 23.5 per cent respectively against the unimproved.—E.B.H.

924 SAUGER, L. L'hybridation de l'arachide à M'Bambey. [**Groundnut hybridization at M'Bambey (Senegal).**] *Agron. trop.* 1949, **4**, 618-24.

Natural hybridization has been seldom observed at M'Bambey. Work of artificial hybridization is being carried out to obtain erect varieties suitable to mechanical cultivation. [See *Plant Breeding Abstracts.*]—E.B.

925 MURTHY, T. S., and IYENGAR, K. G. **Natural hybrids in *Arachis nambyquarae*.** *Curr. Sci.* 1950, **19**, 62. [Agric. Res. Inst., Hebbal]

Two plants, which appeared to be natural hybrids between *Arachis nambyquarae* and *A. hypogaea*, are described. They were of erect habit, one being compact and bearing three-seeded pods, the other loose and bearing two-seeded pods. The pods and kernels are described.—K.O.

926 ROSSIN, M. Deuxième compte rendu sur le développement du plan de culture mécanisée de l'arachide dans l'est africain anglais. (Situation en Mai 1949). [**Second report on the development of mechanical cultivation of *Arachis hypogaea* in British East Africa. (The position in May, 1949).**] *Agron. trop.* 1950, **5**, 42-53.

A first report giving the situation in May, 1948, was published in the "Bull. agron. No. 4" of the "Section technique d'Agriculture tropicale" at Nogent-s.-Marne. As a result of a second inspection in Tanganyika, a complementary report has been drawn up of which this is the first part. [See also *Fld Crop Abstr.* 2, Abs. 1017.]—E.B.

927 STOKES, C. M., and REED, I. F. **Mechanization of peanut [groundnut] harvesting in Alabama.** *Agric. Engng, St. Joseph, Mich.*, 1950, **31**, 175-7. [Alabama Agric. Expt Sta.]

Tests showed that diggers and shakers, meeting the specifications outlined in the text will effectively loosen, lift, shake and windrow heavy runner peanuts. The nuts can then be cured in stacks, piles or windrows. If picking yields from stacks are given a value of 100, the values for picking from the pile and combining from the windrow are 94 and 85.5, respectively. Combining from the windrow caused considerable loss, but a marked reduction in such losses is possible and twelve functional requirements for efficient combining equipment, as indicated in tests, are listed. The quality of the combined and pile-cured peanuts was as good or better than that of the stacked peanuts. Combining effects a big saving in labour.—P.J.B.

FIBRE CROPS

FLAX

928 Bagge, G. Kulturførsog med spindhør 1939-1946. [**Cultivation trials with fibre flax 1939-1946.**] *Tidsskr. Planteavl* 1949, **53**, 85-130.

From 1939 to 1946 experiments were conducted at the Danish State Experiment Stations on time of sowing, method of harvesting, time of pulling, and period of weathering fibre flax. Experiments were also conducted on weed control by: hoeing, spraying with 3 per cent copper sulphate solution, harrowing, and dusting with calcium cyanamide. Recommendations are made as to the most suitable methods to be adopted on the basis of the results obtained.—R.P.J.

929 Arny, A. C. **Registration of improved varieties of flax, IV.** *Agron. J.*, 1949, **41**, 534-5. [Univ. Minnesota, St. Paul, Minn.]

The improved variety Dakota, Reg. No. 8, is described as having a greater seed yield than its Bison parent, a high straw yield of satisfactory fibre content, and an oil content adequate in quality, though one per cent lower in average yield than that of Bison. It is immune to the races of rust prevalent east of the Rocky mountains, and moderately resistant to wilt. Seed and straw yields of Minerva, Reg. No. 9, have been satisfactory, and its oil content has been exceptionally and persistently high. It is resistant to wilt and to most races of rust prevalent in North America.—A.D.H.

930 Robinson, G. R. **The effect of flax stand on yields of flaxseed, flax straw, and weeds.** *Agron. J.* 1949, **41**, 483-4. [Div. Agron. and Plant Genetics, Univ. Minnesota]

Trials to determine the effect of stand on the yields of seed and straw, and on the quantity of weeds present were conducted at St. Paul from 1945 to 1947. Stand differentials were obtained by hand thinning. Results of the 1945-46 trials showed that when the stand of flax was reduced from 100 to 25 per cent, the yields of flax seed and of flax straw decreased, while the quantity of weeds increased. Highly significant differences were obtained between the different flax stands in their yields of straw and in weed infestation. In 1947, when stands of flax varied from 12.5 to 125 per cent, significant differences were also obtained between different stands in straw yield and in weed incidence. Over a 3-year period, a 75 per cent stand produced a significantly lower straw yield and a stand of 25 per cent, a significantly higher quantity of weeds than a 100 per cent stand of flax.—S.D.

931 Lanigan, G. W. **Relationship of fibre quality to bacterial flora in flax retting.** *Nature, Lond.* 1950, **165**, 516-7. [Flax Res. Lab., Commonw. Sci. Ind. Res. Org., Melbourne]

COTTON

932 Roždestvenskiĭ, M. N., and Somov, P. A. [**Concerning norms of sowing non-irrigated cotton.**] *Sovet. Agron.* 1950, **8**, No. 3. 44-8. [Russian] [Sci. Res. Inst. of the Cotton Industry in New Regions]

Trials conducted in 1946 and 1947 by the Scientific Institute of Cotton Investigation, Budennovsk, whose experimental sphere is in the driest zone of the non-irrigated cotton region of the Russian Soviet Federated Socialist Republic, indicated that the yield of cotton lint is the same with all the norms of sowing investigated (40, 50, 55, 70 and 90 kg. per ha.). With timely sowing in well prepared, damp soil any of the norms investigated, even the minimum norm of 40 kg. per ha., gave a sufficient number of seedlings for a satisfactory stand. The 70 kg. rate of seeding compared with 55 kg., and even 40 kg., has no advantage as regards density of stand, dates of flowering and ripening, and yield. With pocket sown plants, as well as with drilled stands, the smaller rates of sowing were not inferior to the maximum sowings in yield. In the propagation of new varieties of non-irrigated cotton the rate of seeding may be reduced from 60-75 kg. to 50 kg. per ha. without detriment to yield.—R.P.J.

933 Hutchinson, J. B. **The dissemination of cotton in Africa.** *Emp. Cott. Gr. Rev.* 1949, **26**, 256-70, bibl. 20.

Though three of the lintless species of the genus *Gossypium* are indigenous in Africa, the linted species, or true cottons, are all thought to have been introduced there by man and, with the exception of *G. herbaceum* var. *africanum*, they are still confined to farms and gardens. There are two Asiastic species, *G. arboreum* and *G. herbaceum*. The former has two races, the more important of which is *soudanense* which occupies the Sudan-West African region, while the other race, *indicum*, is found on the Tanganyika coast and in Madagascar. *G. herbaceum* race *acerifolium* is widely distributed in the Sudan-West African region and *G. herbaceum* race *africanum* in the bushveld of Swaziland, north-east Transvaal, Southern Rhodesia and Portuguese East Africa. Of the New World species, *G. hirsutum* var. *punctatum* is well established in the North African savanna tract from Senegal to the Red Sea, while *G. hirsutum* var.

marie galante is widely distributed on the Gold Coast. *G. barbadense* is only of importance in the forest regions of Southern Nigeria, Togoland and the Nile Valley. An historical survey of the introduction of these species into Africa describes the evolution of the African races of cotton, which have brought wealth to Egypt and revolutionized her agriculture.—A.D.H.

934 MANNING, H. L. **Planting date and cotton production in the Buganda province of Uganda.** *Emp. J. exp. Agric.* 1949, **17**, 245-57, bibl. 14. [Empire Cott. Grow. Corp. and Dept Agric., Uganda]

In the conditions prevailing in Buganda Province, meteorological and experimental evidence show that the optimum planting date is mid-June. It is considered probable that cotton sown at this time benefits from accumulated nitrate-nitrogen immediately before the main flowering flush.—N.G.S.

935 DARLING, H. S. **Cotton growing at Zeidab, Northern Sudan, and the control of *Laphygma exigua*.** *Emp. Cott. Gr. Rev.* 1949, **26**, 271-7. [Min. Agric., Sudan Govt]

936 KNIGHT, R. L. **The distribution of wild species of *Gossypium* in the Sudan.** *Emp. Cott. Gr. Rev.* 1949, **26**, 278-85, bibl. 4.

The distribution and relationships of the wild species of *Gossypium* are important not only from the point of view of the evolution of the cultivated cottons, but also because many of the wild species are of potential economic value. Amongst the best known wild species of the New World are *G. thurberi* and *G. armourianum*, both of which are resistant to pink and Egyptian bollworms, and to virus leafcurl. *G. thurberi* also carries a factor capable of strengthening the lint of commercial cottons. Of the wild species of the Old World, *G. somalense* is resistant to pink and Egyptian bollworm, and *G. anomalum* is nearly immune to black arm disease. Both are indigenous in the Sudan, and their distribution covers a broad belt between the 5 in. and 20 in. isohyets. A botanical description of *G. somalense* race *soudanense* is given. The variability of *G. somalense* in and around Somaliland and its uniformity throughout the remainder of its range are noted. It is evident that the Sudan race of this species has changed little since the last pluvial period ; it must therefore have achieved considerable homozygosity and so fine a balance with its environment that almost any mutation is disadvantageous. The distribution of *D. anomalum* and *G. somalense* is noted in the text.—A.D.H.

937 AGRONOMIE TROPICALE. La culture du coton en Angola. [**Cotton cultivation in Angola.**] *Agron. trop.* 1949, **4**, 640-1.

Information is given regarding production, crop areas, varieties, organization and research. Principal zones of cultivation are a coastal zone in the north, and the region of Malange in the interior. The latter gives the higher production.—E.B.

938 LEGENDRE, R. La campagne cotonnière 1948-49 en A.E.F. [**1948-1949 cotton harvest in French Equatorial Africa.**] *Cot. Fib. trop.* 1949, **4**, 149-52, tables 5. [I.R.C.T., French Equatorial Africa]

1948-49 seed-cotton production of this area (Chad and Ubangi-Shari) was 76,573 tons, being equivalent to 23,203 tons of fibre. These figures compare favourably with the 1947-48 yield and are above those of previous years. A 10-year plan has scheduled the annual production at 42,000 tons of fibre.—E.B.

939 KOCH, P. **Cotton culture.** *Fmg S. Afr.* 1949, **24**, 387-90. [Dept Agric., S. Africa]

A concise account is given of cotton, its botanical characters, cultivation, rotations, soils and climatic requirements. The best varieties for South Africa are Improved Bancroft and U_4.—S.D.

940 KOCH, P. La culture du coton dans l'Union Sud-africaine. [**Cotton cultivation in the Union of South Africa.**] *Rev. Bot. appl.* 1950, **30**, 224-7.

A French translation of an article originally published in *Fmg S. Afr.*, Vol. 24, pp. 387-90 and 396, 1949.—E.B.

941 BONO, P. Il cotone in Sicilia. [**Cotton in Sicily.**] *G. Agric. Domen.* 1950, **60**, 109-10.

The desirability of developing this crop in Sicily, where conditions are favourable, is stressed. Cultivation started over 1000 years ago. At present the most important cotton area is the Plain of Gela in the southern coastal region. Here cotton is the renewing crop in rotation with wheat, the main crop. A hydro-electric reservoir, in course of construction, will increase the supply of irrigation water to the zone. It is pointed out that only 1.5 per cent of the Italian requirement of cotton is covered by the internal (Sicilian) production. The U.S.A. holds first place among suppliers.—E.B.

942 AFZAL, M., and KHAN, A. H. La culture du coton au Pakistan. [**Cotton cultivation in Pakistan.**] *Cot. Fib. trop.* 1949, **4**, 121-32, bibl. 17. [Lab. Res. on Cotton, Lyallpur (Pakistan)]

Most cotton produced in Pakistan is grown in the western zone. Information is given on production, climate, irrigation, varieties, and cultural methods in West Pakistan where 78.9 per cent of the cotton crop is grown under irrigation, the yield being considerably higher than in the Union of India.—E.B.

943 KELLERMANN, J. Note sur les essais d'irrigation du cotonnier dans le Sud-Annam. [**Note on irrigation trials of cotton in South Annam.**] *Cot. Fib. trop.* 1949, **4**, 103-20, bibl. 18.

An account is given of trials carried out at various stations before 1945 to test time of cultivation, cultural methods, frequency and amount of irrigation, and suitable varieties. The rotation followed at Cam-Van was: 1st year, cotton (Jan.-Aug.) and fallow (Aug.-Dec.); 2nd year, maize (Jan.-Apr.), groundnuts (Apr.-Jul.) and fallow (Jul.-Dec.). In other zones *Phaseolus mungo* could be grown in place of groundnuts. In zones where rice is grown, the rotation rice/cotton should be considered.—E.B.

944 AFZAL, M., and HAMID KAHN, A. **Natural crossing in cotton in Western Punjab. 2. Natural crossing under field conditions.** *Agron. J.* 1950, **42**, 89-93, bibl. 15. [Cotton Res. Lab., Lyallpur, Pakistan]

In the western Punjab, most farmers grow both indigenous and acclimatized American varieties of cotton. They are often grown together, a fact that leads to seed supply difficulties through natural crossing. Cotton varieties were grown in a trial plot to determine the extent of natural crossing in different directions, at different distances and during different periods of flowering. The amount of natural crossing found was small, the distance between varieties being the controlling factor. Results showed that a safe distance between crops was 100 ft.—P.J.B.

945 SILOW, R. A. **The evolution and domestication of a crop plant.** *J. Aust. Inst. agric. Sci.* 1949, **15**, 60-8.

The success of cultivated *Gossypium* over the more primitive species has apparently been dependent on the emergence in the genus of two new characters, namely, convoluted lint hairs, which made spinning possible, and the adaptation of the annual habit. The latter character has enabled the range of cotton growing in temperate zones to be extended. Domestication of primitive diploid cottons probably began in the Indus Valley, Sind, at least 3000 years B.C. and cytological evidence suggests that the tetraploid cultivated cottons of the New World are derived from a hybrid of Asiatic and American parentage. *Gossypium barbadense* is widely cultivated in the northern countries of South America and in the west Indies as a perennial tree cotton. Its annual derivatives, the Sea Island cottons (though of high quality, with soft silky fibres 2 in. in length) are of insignificance when compared with the northerly species, *Gossypium hirsutum*. The latter species has wide adaptability so that it now produces more than half the world's cotton crops.—K.O.

946 NELSON, W. L. **The effect of nitrogen, phosphorus, and potash on certain lint and seed properties of cotton.** *Agron. J.* 1949, **41**, 289-93. [North Carolina Agric. Exp. Sta.]

The effects of nitrogen, phosphorus and potash on certain fibre and seed properties of cotton were investigated in 1944/46. A fine sandy loam (pH 6.0), very deficient in N and K_2O and moderately deficient in P_2O_5, was used. Yields of seed cotton were increased 68 per cent by nitrogen, 23 per cent by phosphate, and 67 per cent by potash, the increase being mainly due to greater numbers of bolls. The percentage of lint was decreased by N; P_2O_5 and K_2O had little effect. The effects on fibre qualities are set out in detailed tables. First additions of K_2O gave a more uniform fibre and increased the length of shorter fibres and the wall thickness. Effects were most marked on bolls from the top portions of the plants.—J.L.

947 DUGAST, R. Les *Earias* du cotonnier au Soudan français. [***Earias* of cotton in French Sudan.**] *Cot. Fib. trop.* 1949, **4**, 68-75 and 133-42.

Cotton has long been grown by the natives of the French Sudan by extensive methods. The Office du Niger (in charge of development in the central part of the Niger valley) has evolved intensive methods of cultivation and introduced selected varieties. The damage caused by *Earias* is described. In January, 1947, from 18 to 22 per cent of the cotton bolls were attacked. Host plants are indicated. On infected plots, ripening is delayed. Modified cultural methods and early varieties are advised as means of control. The possibilities of adopting chemical and biological control methods are also considered.—E.B.

948 PEARSON, E. O. **Problems of insect pests of cotton in tropical Africa.** *Emp. Cot. Grow. Rev.* **26**, 1949, 85-99.

Cotton in Africa is grown in three main climatic zones comprising: the semi-arid zone, as typified by the Gezira in the Sudan; the savannah regions with monsoon type of climate, which include the interior of British West Africa; and the equatorial zone, including such areas as the Guinea forests and Uganda. In the sub-Saharan dry belt *Gossypium hirsutum* var. *punctatum*, which originated in the New World, has spread from the Slave Coast through the native colonies. *G. barbadense* var. *brasiliense* has spread from both east and west coasts while many Asiatic cottons have penetrated to Egypt and the Sudan.

Much damage is caused by seven major pests: *Platyedra gossypiella, Heliothis armigera, Diparopsis castanea, Dysdercus* spp., *Empoasca* spp., *Helopeltis sanguineus* and *Lygus vosseleri*. The distribution and importance of these pests to the ecology of the crop is explained, and the approach to various methods of control is considered. Much has been done through 'control by evasion', e.g., manipulating the time and length of the growing season so as to limit insect survival or confining cotton growth to certain climatic regions. Other methods of control are being sought. The search for resistant varieties continues and methods of insecticidal control are being worked out for use under tropical farming conditions.—M.E.E.

JUTE

949 PAKISTAN, Office of the High Commissioner. **Devaluation and jute.** Press Attache. 22nd December, 1949. pp. 6. [Mimeographed]

950 SINGH, D. **Jute in the Indian Dominion.** *Indian Fmg* 1948, **9**, 1-3.

In this address to the Indian Central Jute Committee, Sir Datar-Singh reviews the country's new constitutional set-up and the ways and means of increasing jute production in the Indian Union. Registered seed growers and provincial farmers should grow more improved seed. Aman land should be utilized for sowing early jute varieties and hitherto uncultivated land brought under cultivation for intensive jute production.—E.B.H.

OTHER CROPS

WILD YAM

951 CHEVALIER, A. Sur un igname sauvage de l'Ouest africain à tubercules comestibles (*Dioscorea hastifolia* Pax = *D. lecardi* De Wildem.). [**A wild yam of West Africa with edible tubers** (***Dioscorea hastifolia*** **Pax =** ***D. lecardi*** **De Wildem.**).] *Rev. Bot. appl.* 1949, **29**, 609-12.

Following a discussion on systematics, information is given on habit, geographical distribution and the origin of this species. It is cultivated in a limited zone in the Cameroons and Ubangi-Shari.—E.B.

CROP BOTANY

PLANT PHYSIOLOGY

952 MER, C. L., and RICHARDS, F. J. **Carbon dioxide and the extension growth of etiolated oat seedlings.** *Nature, Lond.* 1950, **165**, 179-80. [Res. Inst. Pl. Physiol., Imp. Coll. Sci. Tech., London, S.W.7.]

The abstract of this work recorded in *Field Crop Abstracts* Vol. 3, Abs. 570, 1950 is incorrect and should be cancelled; the following authors' abstract is substituted.

Etiolated *Avena* seedlings are shown to be sensitive to high concentrations (5 per cent) of carbon dioxide; the effect being to stimulate mesocotyl elongation and depress the growth of the coleoptile.—Authors' abstract.

953 ELGABALY, M. M., and WIKLANDER, L. **Donnan equilibria in plant nutrition. I. Effect of exchange capacity of clay minerals on the uptake of sodium and calcium by excised barley roots.** *K. LantbrHögsk. Ann.* 1949, **16**, 328-32.

——— **Donnan equilibria in plant nutrition. II. Effect of acidoid content of plant on the uptake of sodium and calcium from Bentonite suspensions.** *K. LantbrHögsk. Ann.* 1949, **16**, 334-8.

954 LUNDEGÅRDH, H. **Quantitative relations between respiration and salt absorption.** *K. LantbrHögsk. Ann.* 1949, **16**, 372-403. [Plant Physiol. Inst., Royal Agric. Coll., Uppsala]

Experiments were carried out on wheat roots in solutions of NO_3, Cl and KCN, and also in distilled water. The results, given in the text, indicated a true qualitative relationship between the absorption of anions and anion respiration.—P.J.B.

955 MATTSON, S., ERIKSSON, E., VAHTRAS, K., WILLIAMS, E. G. **Phosphate relationships of soil and plant. (1) Membrane equilibria and phosphate uptake.** *K. LantbrHögsk. Ann.* 1949, **16**, 457-83. [Pedology Inst., Royal Agric. Coll., Uppsala]

Experiments on the effect of different chlorides and nitrates on the composition of peas showed little influence on their K, Mg or Ca content, but caused a marked increase in their phosphorus uptake. This in turn improved their cooking quality, known to be related to phytin content. A theoretical investigation of the effect of salts upon anion uptake follows on the basis of the Donnan distribution of ions between the root membrane and the soil solution. The conclusions show that the addition of a salt would cause more rapid diffusion of P_2O_5 through the root membrane. This was borne out in experiments using cellophane membranes and in experiments on pea and rye roots. Rye roots responded to the salt effect at a lower concentration than pea roots, due probably to a higher acidoid content in the pea roots. This physicochemical fact offers an explanation of why legumes in general absorb relatively more divalent than monovalent cations as compared to grasses. Data are given on the effect of salts on the phosphorus uptake in a soil medium.

Experiments with methylene blue uptake indicated that most of the active acidoids are localized in the surface layer in the cell coatings and most of all in the growing tip. The function of pectin in the cell coatings as a cation accumulator and exchanger more easily accounts for the absorption of nutrient ions than the excretion of CO_2. It may account for why plants are so little affected by cation concentration and pH, since the base binding capacity of pectin remains nearly constant over the range of physiological and soil pH.—P.J.B.

956 LUNDEGÅRDH, H. **Growth, bleeding and salt absorption of wheat roots as influenced by substances which interfere with glycolysis and aerobic respiration.** *K. LantbrHögsk. Ann.* 1949, **16**, 339-71, bibl. 27. [Plant Physiol. Inst., Royal Agric. Coll., Uppsala]

Preliminary experiments showed that sap movement in wheat roots was linked with anaerobic glycolysis and that this process depended initially on aerobic anion respiration (salt respiration) and accumulation of salts. It was shown that the two groups of reactions regulating the absorption, transport and exchange of salts in cells and tissues, could be separated by the use of iodine acetate and fluoride as glycolysis inhibitors and cyanide and azide as salt accumulation inhibitors. No close relation existed between growth and bleeding of severed roots or growth and ion absorption. Growth continued during completely checked anion respiration or in conditions of much reduced bleeding. Bleeding continued for a time during completely checked growth or ion accumulation. The cessation of growth of the root cells did not decrease the accumulation of ions or their transport through the tissues. The normal full development of cell and tissue life, however, postulated the existence of undisturbed glycolysis and complete aerobic respiration.—P.J.B.

957 PAAUW, F. van der Invloed van de watervoorziening op de ontwikkeling en de opbrengst van haver. [**Influence of water supplies on the development and yield of oats.**] *Ned. kruidk. Arch.* 1950, **57**, 158-9.

In this abstract of an address to the Netherlands Botanical Society the points discussed were: the effect of drought on the assimilates in the developing plant and the growth in length of leaf and stem; the effect of drought on yield as it relates to the stage of development at which the drought is experienced; the effect upon the transpiration of the plant of rising temperature (very considerable), light intensity (very much less important), force of the wind (generally *nil*), stage of development (transpiration capacity greatest shortly before leaf growth finishes), size of the transpiration surface (the principal governing factor), moisture content of the soil (has little effect); and the effect of temperature upon assimilates.—G.M.R.

958 SCHREIBER, R. Über die Wirkung des Magnesiums auf den Ertrag und die Nährstoffaufnahme von K_2O und MgO bei den Getreidearten. [**The action of magnesium on the yield and on the intake of the nutrients K_2O and MgO in cereals.**] *Z. PflErnähr. Dung.* 1949, **48**, 37-64. [Inst. Agric. Chem., Justus-Liebig-Hochsch., Giessen]

These were pot experiments and the elements were supplied as sulphates. The best results from all four cereals (wheat, barley, rye and oats), whether measured as plant growth or as yield and quality of grain and straw, were obtained by adding potassium and magnesium sulphates in combination. The content of magnesium and potassium was equally high in the grain of all four cereals but not in their straw. Oats require more magnesium than do the other cereals.—D.B.

959 RAUTERBERG, E. Einfluss steigender Stickstoff-, Phosphorsäure- und Kaligaben auf die Entwicklung und den Ertrag von Bohnen (*Phaseolus vulgaris*) und die Bedeutung des Nährstoffverhältnisses. [**Influence of increasing quantities of nitrogen, phosphoric acid and potassium on the development and yields of beans (*Phaseolus vulgaris*) and the significance of nutrient relationships.**] *Z. PflErnähr. Dung.* 1949, **47**, 167-79, bibl. 1. [Univ. Berlin]

960 BREWER, H. E. **Tetrazolium chloride as a test for damage in artificially cured peanuts.** *Science* 1949, **110**, 451-2. [Dept of Botany and Plant Pathology, Alabama Polytechnic Institute, Auburn]

Artificial curing methods suitable for cereals and oil crops have proved inapplicable to peanuts because of the uncertainty of their effect upon the flavour and also because of the heat- and moisture-insulating properties of the shell. The successful use of tetrazolium salts for testing damage in maize suggested their possible application as a quick test for damage in artificially dried peanuts.—E.B.H.

961 Chinoy, J. J. **Effect of vernalization and photoperiodic treatments on grain development in wheat.** *Curr. Sci.* 1949, **18**, 414, bibl. 4.

In previous experiments on the correlations between yield, 1000-grain weight and mean maximum temperature of the ripening period (see *Herb. Abstr.* 17, Abs. 1435), when the temperature of the ripening period exceeded a certain level, the grain filling processes in wheat were affected; the grain remained shrivelled and the yield was reduced. To confirm this result and to ensure that the effect of the temperature of the ripening period on yield and 1000-grain weight of wheat is paramount over other factors, vernalization and photoperiodic treatments were given to a number of wheat varieties selected from different flowering classes, for accelerating or retarding their developmental processes and thus synchronizing their ripening periods either with a lower temperature range during February-March (78-80°C.) or with a higher temperature range during April-May (90-95°C.). When flowering in early wheat varieties was delayed (to shift the ripening period to hotter months), yield per plant and 1000-grain weight were reduced. The ripening period was shortened. When flowering was accelerated in late varieties by vernalization and photoperiodic treatments (making these varieties ripen in February/March) it was found that yield and 1000-grain weight increased. The ripening period was considerably lengthened (from 20-30 days to 40-60 days) due to lower temperature.—K.O.

962 Chinoy, J. J., and Nanda, K. K. **Photoperiodic treatment and nitrogen uptake in wheat.** *Curr. Sci.* 1950, **19**, 24-5, bibl. 12. [Bot. Dept, Univ. Delhi]

Under normal-day conditions, the nitrogen content of the leaves decreases rapidly, and is, ultimately lower than under long-day or short-day treatments. It is suggested that the nitrogen content remains high under short-day treatment because rapid utilization of the nitrogen is hindered by low carbon assimilation. The ratio between the nitrogen content of the stem and of the leaf rises steeply after flowering in the short-day and normal-day treatments: it is always high under long-day conditions. The increase in ear nitrogen corresponds to decreases in stem and leaf nitrogen, thus showing there is translocation of nitrogen to the ear. Results vary with the different varieties of wheat, due to their different growth patterns. It is suggested that the same factors which check tiller production and dry weight increase in long-day and precocious varieties also govern nitrogen uptake, and its early translocation to the stem.—N.G.S.

963 Chinoy, J. J. **Effect of vernalization and photoperiodic treatments on growth and development of wheat.** *Nature, Lond.* 1950, **165**, 882-3. [Bot. Dept, Univ. Delhi]

There is an indication that alterations in the rate of the developmental process brought about as a result of vernalization and photoperiodic treatments change the growth pattern of the plant. The change, however, is in different phases and components of growth (e.g. leaf and tiller numbers, dry weights of leaf and stem) and not so much in total magnitude, because relative growth rates of different wheat varieties do not change appreciably with the time of flowering. The significance of these facts is discussed.—M.H.

964 King, Chen-Chung **A preliminary note on the effect of day-length upon the development of wheat.** *Bot. Bull. Acad. Sinica,* 1949, **3**, 134.

The four wheat varieties Lee-Jen No. 4, 9H178 (spring types), Chung-Noon 28, and King-Tah 4197 (winter types), were subjected to three different light treatments, namely, (1) natural day-length (control), (2) short-day (8 hours daylight), and (3) long-day (continuous illumination by 100W. electric bulbs for 16 hours), in addition to the short-day treatment. Tillering was more vigorous under the short-day condition but the length of leaf blades was less under short- than under long-day conditions. Plants grown under the long-day treatment came to ear earlier than the control plants by 20, 13, 7 and 9 days in the order of Lee-Jen No. 4, 9H178, Chung-Noon 28, and King-Tah 4197 respectively. The last three varieties failed to form culms and ears under short-day conditions but Lee-Jen No. 4 showed culms at the end of the experiment.—K.O.

965 Sen Gupta, J. C., and Sen, Gita **Photoperiodic induction in jute and a great acceleration of vegetative growth in *C. capsularis*.** *Nature, Lond.* 1950, **166**, 152-3. [Bot. Lab., Presidency Coll., Calcutta]

966 Sen Gupta, J. C., and Saha, Jyotiranjan. **Effect of sowing time and photoperiods in *Sorghum roxburghii* var. *hians*, Stapf (Jowar).** *Nature, Lond.* 1950, **166**, 75-6. [Bot. Lab., Presidency Coll., Calcutta]

The variety is a short-day plant, and, in flowering behaviour, it is influenced by the daily light period more than by any other factor. Details of the work are to be published elsewhere.—M.H.

967 SIRCAR, S. M., and SEN, S. P. **Photoperiodic induction and the development of growing apex in rice.** *Nature, Lond.* 1950, **165**, 855, [Cent. Coll. Agric., Anad Parbat, New Delhi]

A full report of this work is to be published elsewhere.—M.H.

968 MISRA, G. **Photoperiodic response in some X-ray mutant wheats.** *Curr. Sci.* 1949, **18**, 413-4, bibl. 5. [Dept Bot., Univ. Allahabad]

The present study was designed to test if the photoperiodic response of two new strains of wheat R-1 (Sarojini) and R-9 (Vijaya), followed the general trend of other Indian wheats. A table on the effect of long-day and short-day treatments (at different ages of the seedlings) on ear emergence, showed that long-day conditions during the vegetative phase brought about significantly earlier ear emergence in both the mutants and the effect was more pronounced if the long days were applied at the early seedling stage. With increased seedling age, the long photoperiods produced gradually less effect in inducing earliness. Short-day treatment retarded flowering, the effect gradually diminishing as the treatment was applied at later stages in the advancing age of the plant. The results indicated that the mutants resembled other Indian varieties in the general trend of their photoperiodic response, and long-day treatment during their vegetative phase accelerated their normal life-cycle, although as such they tolerated the available short days of India and set good grains.—K.O.

969 OVEČKIN, S. K. [**The influence of phosphate, applied after the light stage of development, on growth of spring wheat.**] [Russian] *Doklady Akad. Nauk SSSR* 1949, **69**, 453-5. [Harjkov Inst. Genet.]

Melanopus 69 was studied. The characteristics of the plants grown with different supplies of phosphate are noted at varying stages of growth.—M.H.

970 NEGOVSKIĬ, N. A. [**Phasic development of sugar beet plants and breeding to reduce bolting.**] [Russian] *Agrobiologija* 1949, No. 5, 28-37. [Kiev, All-Union Sci. Res. Inst. for Sugar Beet]

971 LIVINGSTONE, J. E., and SWINBANK, J. C. **Some factors influencing the injury to winter heads by low temperatures.** *Agron. J.* 1950, **42**, 153-7, bibl. 7. [Dept. of Plant Pathology, Nebraska Agric. Expt Sta., Lincoln]

Injury to winter wheat heads by late spring frosts in Nebraska is reported. Damage was most severe in early-maturing varieties frosted at the stage when the ear had emerged from the boot. The question arose as to whether the winter wheat varieties Pawnee and Wichita might not head too early for Nebraska conditions. A series of greenhouse experiments was carried out to investigate the relationship of frost damage in wheat heads to: (a) stage of development, (b) connexion between temperature and length of exposure, (c) soil fertility and (d) free-moisture on heads. Data are given in five tables.

In experiments on the frost susceptibility of Pawnee wheat, temperatures of 0°C. and above caused almost no sterility. It was seen that temperatures below 0°C. resulted in rapid injury to the heads and floral sterility. Exposure of heads for only 2 hours at -4°C. resulted in considerable damage. The greatest amount of field injury was observed when frost coincided with pollination time. Heads in the boot showed less injury, as did heads in which the fertilized embryos had begun to develop. Grain weight per 1000 kernels showed a slight fall in the case of grain from frosted plants. Tests on the heads of the spring wheats Reliance and Thatcher, wetted, hardened at 4°C. and then frosted, showed that wet heads were much more susceptible to frost than dry ones. High levels of soil fertility were seen to lead to greater susceptibility to frost damage than soils of low fertility. In nine varieties of spring and winter wheats floral sterility was influenced more by the stage of development at the time of exposure than by varietal susceptibility.—P.J.B.

972 CHRISTIANSEN-WENIGER, F. Gefässversuche mit hitzeempfindlichen und hitzeresistenten Getreidearten im sommerheissen Steppenklima unter besonderer Berücksichtigung des Wasserverbrauchs und der Wasserleistung. [**Experiments on the vascular system of heat-sensitive and heat-resistant varieties of wheat in a steppe climate with high summer temperatures, giving special consideration to the uptake of water and the water efficiency.**] *Z. PflErnähr. Dung.* 1949, **46**, 18-60, bibl. 38. [Inst. Plant Cultivation and Breeding, Agric. College, Ankara, Turkey]

Factors which promote growth, e.g., favourable weather, friable soil, and supplies of nutrients, cause an increase in the total amount of water used by the plant, but at the same time the water is used more efficiently. Factors which depress plant growth reduce the water efficiency.—D.B.

973 DONÀ dalle ROSE, A., and TOMBESI, L. Ricerche sulla nutrizione idrica del lino da olio. Nota 1. [**Research on water nutrition of oil flax. Note 1.**] *Ann. Sper. agr.* 1950, **4**, 15-28, [English summary, p. 28]. [Sta. chim.-agr. sper., Roma]

This research was carried out at the above station, with the variety Marsich, with the purpose of determining unit water consumption. The results are not conclusive and the research is to be continued.—E.B.

974 Frey-Wyssling, A. **The growth in surface of the plant cell wall.** *Growth* 1948, **12** (Supplement), 151-67. [Swiss Federal Inst. of Technol., Zurich]

A study of the submicroscopic morphology of cell walls shows that their surface growth consists in a loosening of an existing framework of microfibrils, and an interlacing of new microfibrils into the extending fabric. Growth in surface of membranes is intimately linked with the important phenomena of biosynthesis, respiration and morphogenesis. This article is illustrated with plates and tables and the examples used are from corn, wheat roots or root-hairs, and cotton fibres.—S.D.

975 New York State Agricultural Experiment Station. Bull. No. 740. **A method for testing the germinability of large seeds.** By *M. T. Munn.* 1950, pp. 10.

The seeds are placed in rolls of moist paper, supported in a nearly vertical position in trays or baskets. This method enables the conditions of normal geotropism to come into play during germination, thus making it possible to appraise stem and root growth. The method can be adapted to the testing of legume and grass seeds in cases where mechanical injury to the seeds makes the normal development of root and cotyledon doubtful.—P.J.B.

976 Zubkus, L. P. [**Viability of immature embryos of *Phaseolus* in nutrient media.**] [Russian] *Agrobiologija* 1950, No. 1, 137-41. [Bot. Garden, Filial Acad. Sci. USSR., Novosibirsk]

Viability of excised embryos depends not on their size but on the degree of their differentiation at the time of separation from the mother plant. This differentiation is not always directly proportional to embryo size but depends on environmental conditions prevailing during seed formation.—M.H.

977 Scharnagel, Th., and Rippel, K. Neue Erkenntnisse auf dem Gebiete der Saatgutbewertung. [**Evaluation of seed.**] *Beitr. Agrarwiss.* 1948, **4**, 21-45, bibl. 187. [München-Weihenstephan]

A literature review of the biology of the wheat plant.—D.B.

978 Uttaman, P. **A study in contrast of the effects of cocoanut [coconut] water on the growth of immature embryos of corn (maize) when applied before and after germination of the embryo.** *Curr. Sci.* 1949, **18**, 343-4. [Agric. Res. Inst., Coimbatore]

To determine the effect upon growth of natural extracts (coconut meal extract and young corn ovule extract), 2-week-old maize embryos were submitted to the following treatments: (1) Coconut water applied at the time of placing the embryo in the medium. (2) Coconut water applied the next day when the embryo had just started to grow. (3) Control. Results showed the growth to be more marked when the extract is applied after germination.—E.B.H.

979 Uttaman, P. **Growth-promoting factors in corn germ extract.** *Curr. Sci.* 1950, **19**, 21-2, bibl. 3. [Agric. Res. Inst., Coimbatore]

The experimental method and the three treatments given in comparing corn germ [presumably maize] with coconut water in their effect on embryo growth of corn [maize] are described. The extract was applied at the germinal stage of the corn embryo. The results indicated that the effect of corn germ extract on the growth of the embryo is more marked than that of coconut water, and that it is of a more progressive nature. These results confirmed the findings of earlier workers.—K.O.

980 Vanterpool, T. C. **Chlorotic banding of cereal seedlings.** *Sci. Agric.* 1949, **29**, 334-9. [Univ. Saskatchewan, Saskatoon]

Chlorotic banding, whitespot banding, and injury similar to damping-off were produced on spring-sown cereal seedlings by high surface-soil temperatures 1 to 4 days after emergence. Chlorosis first appeared when these temperatures registered from 42° to 45°C. (108° to 113°F.); whitespot injury increased as the temperature rose to 52°C. (125°F.); and collapse and death occurred from 52° to 54°C. (125° to 129°F.) and higher. These soil temperatures prevailed on clear summer days when air temperatures ranged from 24° to 35°C. (75° to 95°F.). Greening or recovery of the chlorotic bands took a few to 10 days or more. The whitespot or bleached lesions did not recover, but later development of affected seedlings was normal. Injury to the growing points resulting in collapse was fatal. The same three types of symptoms are commonly found on seedlings which have been subjected to surface-soil temperatures at or near the freezing-point. Thus the same physiological effects on the development of chlorophyll and its precursors in spring-sown cereal seedlings can be produced by temperatures at or near the minimal and maximal cardinal points for growth. Slightly higher rates of sowing for late-sown cereals should insure against reduction in stand by [excessive] heat.—Author's summary.

BIOCHEMISTRY

981 NOLAN, K., and WILCOXON, F. **Method of bioassay for traces of Parathion in plant material.** *Agric. Chem.* 1950, **5**, pp. 53 and 74, bibl. 3. [American Cyanamid Co., Stamford, Conn.]

A description is given of a method for detecting Parathion present in plant tissues in concentrations as low as 0.02 ppm., using the larvae of *Aedes aegypti*.—P.J.B.

982 SREENIVASAN, A., and WANDREKAR, S. D. **Biosynthesis of vitamin C in germinating legumes.** *Nature, Lond.* 1950, **165**, 765-6, [Dept Chem. Tech., Univ. Bombay]

The work reported here on *Phaseolus radiatus* could generally be confirmed with *Cicer arietinum, Pisum arvense, Lens esculenta* and *Phaseolus acontifolius*. The study is being continued.—M.H.

983 WESTALL, R. G. **Isolation of γ-amino-butyric acid from beetroot (*Beta vulgaris*).** *Nature, Lond.* 1950, **165**, 717-8. [Low Temp. Res. Sta., Univ. Cambridge]

984 THOMPSON, K. F., MACKEY, J., GUSTAFFSON, Å., and EHRENBERG, L. **The mutagenic effects of radiophosphorus in barley.** *Hereditas, Lund* 1950, **36**, 220-4.

985 GUTTENBERG, H. von, and STEINMETZ, Elizabeth Der Einfluss des Aethylens auf Wuchsstoff und Wachstum. [**Effect of ethylene on growth substance and growth.**] *Die Pharmazie* 1947, **2**, 17-21, bibl. 27. [Univ. Rostock, Germany]

Ethylene influences plant growth unfavourably causing, among other things, stunting and abnormal response to geotropism. Since growth was affected, an investigation was made into the manner in which ethylene acts on auxin and heteroauxin present in the plant. The material consisted of seedling plants of *Avena sativa, Phaseolus coccineus* and *Helianthus annuus*.—D.B.

986 GUTTENBERG, H. von, and LEHLE-JOERGES, Elisabeth Über das Vorkommen von Auxin und Heteroauxin in ruhenden und keimenden Samen. [**The presence of auxin and heteroauxin in dormant and sprouting seeds.**] *Planta* 1947, **35**, 281-96. [Univ. Rostock, Germany] [Received 1950]

Test plants were *Zea mays, Triticum sativum, Fagopyrum esculentum*, and *Tropaeolum major*. Extracts from both dry and soaked seeds contained heteroauxin as well as auxin. On account of its large caryopsis *Zea mays* was chosen for a separate extraction from endosperm and embryo and also from coleoptile, scutellum and radicle. The extractions, which were made when germination had proceeded for 5 days, showed that growth substance migrated from the endosperm to the embryo, and that heteroauxin penetrated only as far as the mesocotyl while auxin was present in all parts, including the coleoptile.—D.B.

987 LEONE, Ida A., and BRENNAN, Eileen **Response of several economically important plants to sodium salt of 2,4-D.** *Agric. Chem.* 1949, **4**, 40-3 and 82-5. [Rutgers Univ., New Brunswick, N.J.]

To investigate the injurious effect of traces of 2,4-D in the soil, experimental plants were grown in sand and water culture and treated with minute amounts of the Na salt of 2,4-D. Tests were made to determine the response of a given species to an incorporation of 2,4-D in the nutrient substrata; a study was made of the concentration of 2,4-D in the substrata necessary to produce the response. The difference in response in a given plant to 2,4-D applied through the root or aerial portions was checked. The experimental plants included *Phaseolus vulgaris, Zea mays* and *Polygonum fagopyrum.* Cultural methods of application and results of experiments are described. The most common effect of 2,4-D compounds on plants was the epinastic curvature of the leaves and stems. The degree of curvature varied with the concentration of the hormone applied, especially when applied through the roots. The plant at the highest concentration (4 ppm) showed the greatest amount of distortion. Variations in leaf size, colour and texture, and leaf chlorosis were apparent results of 2,4-D application. —K.O.

988 HAGBORG, W. A. F., WARNER, G. M., and PHILLIPS, N. A. **Use of 2,4-D as an inhibitor of germination in routine examinations of beans for seed-borne infection.** *Science* 1950, **111,** 91, bibl. 3. [Dominion Lab. of Plant Pathology, Univ. of Manitoba, Winnipeg]

A short article on the use of culture media containing 50 ppm of 2,4-D to inhibit bean seed germination whilst permitting the growth of seed borne fungi.—P.J.B.

989 TULLIS, E. C., and DAVIS, W. C. **Persistence of 2,4-D in plant tissues.** *Science* 1950, **111**, 90-1. [Agric. Research Admin., U.S. Dept Agric., Beaumont, Texas]

It is reported that beans sprayed with 2,4-D whilst in the green pod stage gave rise to seeds that on germination showed characteristic 2,4-D malformations. The same type of damage has been reported in cotton.—P.J.B.

990 Rhodes, A., Templeman, W. G., and Thruston, M. N. **The effect of the plant growth regulator, 4-chloro 2-methyl phenoxyacetic acid, on the mineral and nitrogen contents of plants.** *Ann. Bot., Lond.* 1950, **14**, 181-98. bibl. 7. [Jealott's Hill Res. Sta., Bracknell, Berks.]

Certain concentrations of the aryloxyacetic acids, notably 4-chloro 2-methyl phenoxyacetic acid (MCPA), produce a differential effect on the growth of different species and this may be utilized as a means of selective weed control. The nature of this differential response has been investigated in an earlier work on spring oats (variety 'Victory'), corn chamomile (*Anthemis arvensis*), and rape (*Brassica campestris*). The sodium salt of MCPA markedly interfered with the potassium metabolism of the most susceptible species, rape, but had little or no effect on that of corn chamomile and oats. In this paper these preliminary results are presented in greater detail together with a further investigation of the effect of sodium 4-chloro 2-methyl phenoxyacetate on the mineral and nitrogen contents of another susceptible species, *Solanum lycopersicum*, and the influence of the potassium status of the plant on its response.—From introduction.

991 Goodall, D. W. **Studies in the diagnosis of mineral deficiency. VI. The composition of weed leaves in relation to potassium deficiency in barley.** *Ann. appl. Biol.* 1949, **36**, 352-63.

Leaves of five weed species (*Brassica sinapis, Cirsium arvense, Polygonum aviculare, P. convolvulus* and *Potentilla reptans*) from fertilizer trials on barley at four sites in Hampshire were analysed with a view to using their composition in forecasting the response of barley to fertilizers. The samples were gathered from as many of the 108 plots as possible, and were analysed spectrographically for Ca, Fe, Mg, Mn, K and Na.

Marked differences in composition between the five species were recorded, the most noteworthy being the high sodium content of *Brassica sinapis* and *Cirsium arvense* and the high manganese content of *Potentilla reptans*. There were also marked differences between the four sites, but these were not uniform as between the different species, and often failed to agree with those observed for barley. Superphosphate applications decreased the manganese content of the weeds in many cases, and increased their calcium content. Muriate of potash increased their potassium content, but tended to decrease that of magnesium and sodium. The only general effect of sulphate of ammonia on the composition of the weeds was a decrease in iron content. Except in *Cirsium arvense*, the potassium content of weed leaves was correlated with that of barley on the same plot if differences within a site only were considered. Differences between sites were not correlated in this way. The correlation between potassium content of weed leaves and the response of barley to muriate of potash application was worthy of note only in *Polygonum convolvulus*, and even in this case the correlation of site differences did not reach significance. It is tentatively suggested that increases in the grain yield of barley as a result of muriate of potash application are likely to occur only where the leaves of *P. convolvulus* contain less than 1.83 per cent potassium.—Author's summary.

992 Virtanen, A. I., and Hausen, S. S. v. Über die Bedeutung der das Redoxpotential erniedrigenden Stoffe für das Wachstum der Pflanze. [**The significance for plant growth of substances which lower the redox potential.**] *Z. PflErnähr. Düng.* 1949, **45,** 11-22, bibl. 10. [Biochem. Inst., Helsinki]

993 Mattson, S., Eriksson, E., Vahtras, K., and Williams, E. G. Membrangleichgewichte und Phosphataufnahme in Pflanzen. [**Membrane equilibrium and uptake of phosphates in plants.**] *Z. PflErnähr. Düng.* 1949, **45,** 23-37, bibl. 13.

The presence of salts permits a greater concentration of phosphate and nitrate ions in the electronegative pectincellulose root membrane. This membrane possesses strongly acidic properties and the capacity for a high cation exchange. The protoplasmic membrane is fed by the outer pectincellulose membrane, the composition of which is of greater consequence in the uptake of nutrients than is the composition of the outer medium. The results of experiments with cellophane membrane, rye, barley, and peas are in agreement with the Donnan Law of Distribution of Ions.—D.B.

994 Jessen, W. Über die Wirkung steigender Stickstoff- und Phosphorsäuregaben auf das Wachstum sowie die Eiweiss- und Fetterträge der Ölrauke. [**The effect of increasing amounts of nitrogen and phosphoric acid on growth and on yields of protein and fat in the hedge mustard.**] *Z. PflErnähr. Düng.* 1949, **47**, 164-7, bibl. 4. [Agric. Exp. Sta., Kassel-Harleshausen, Germany]

In pot experiments, yields of straw, seed, fat and protein increased with increasing additions of nitrogen, and even with very small amounts of phosphoric acid. Nitrogen additions produced a higher percentage of protein, but a lower percentage of fat in the seed. Increasing amounts of phosphoric acid were without effect on the percentage of protein in the seed, but they caused a diminution in the percentage of fat.—D.B.

995 SCHARRER, K., and SCHROPP, W. Untersuchungen über die Wirkung von Chlor und Brom auf die Keimung und die erste Jugendentwicklung einiger Kulturpflanzen. [**The effect of chlorine and bromine on germination and the first stages of development of some cultivated plants.**] *Z. Pfl-Ernähr. Düng.* 1949, **46,** 88-110. [Agric. chem. Inst., Univ. Giessen; and South German Expt Sta. for Dairying, Weihenstephan]

The test plants were wheat, rye, barley and oats grown in sand and clay soils, in pots. The amounts of chlorine per pot ranged between 0.000003 mg. and 300.0 mg. Chlorine as sodium chloride was not merely tolerated by the cereals, but it produced higher yields than in controls. On the other hand, chlorine as sodium chlorate or perchlorate had a distinctly toxic effect. Chlorine as calcium chloride had a less favourable effect on germination of cereals in clay than in sandy soils. The order of sensitivity of the plants towards chlorine was: barley > oats > wheat > rye. Bromine, as potassium bromide, potassium bromate and bromine, was administered at time of seeding and after successful germination, the amounts of bromine ranging between 0.000003 mg. and 30.0 mg. The order of sensitivity of the plants was: barley > wheat and oats > rye. Similar tendencies were shown on clay and sandy soils, but they were less marked on clay.—D.B.

996 PARKER, F. W. **Phosphorus in soils and fertilizers.** *Science* 1950, **111,** 215-20, bibl. 1. [Bureau of Plant Industry, U.S. Dept Agric., Beltsville, Md]

The balance between phosphorus removed by harvested crops and that replaced by applications of artificial fertilizers and manures over the whole of the United States is discussed. Maps show the present position. Investigations were made on the yield and phosphorus uptake of vetches in relation to the following factors:—the effect of the source of phosphorus, the rate of application, the soil history. A table of results is given, including:—rate of application, total yield of four cuttings and amount of phosphorus derived from the fertilizer. A similar trial using *Medicago sativa* was carried out and a table of the results over four successive cuttings is given in graphic form. In trials at Colorado with sugar beet, ribbon placement of fertilizer was compared with its incorporation in the soil by rototiller, using four different phosphorus fertilizers. Ribbon placement of superphosphate gave the better results. The results are tabulated.

Experiments indicated that crops differed widely in their capacity to utilize soil and fertilizer phosphorus: thus it was found that maize, except in the initial stages of its growth, utilized soil phosphorus to a relatively greater extent than the other crops tested. In a test with cotton in soils with high and low available phosphorus, very little difference was observed in the respective amounts of fertilizer phosphorus taken up. This was also borne out in the case of maize.—P.J.B.

997 UNITED STATES, Department of Agriculture. Tech. Bull. No. 995. **The chemical composition of various wheats and factors influencing their composition.** By *J. H. Schollenberger* and others. 1949, pp. 33.

Data are given of the ash, protein, oil, sugar and starch content of 116 samples of hard red spring wheat, 137 of hard red winter, 10 of durum, 107 of soft red winter and 111 of white wheat.—P.J.B.

MORPHOLOGY AND HISTOLOGY

998 CANNON, W. A. **A tentative classification of root systems.** *Ecology* 1949, **30**, 542-8.

Reasons are given for classification of the different types of root systems as primary, lateral and adventitious. The possible effects on roots of environmental factors is mentioned and there is a description of the primary root system of *Zea mays*.—S.D.

999 GREER, E. N., and HINTON, J. J. C. **The two types of wheat endosperm.** *Nature, Lond.* 1950, **165,** 746-8. [Cereals Res. Sta., St. Albans]

1000 EAMES, A. J. **Histological effects of treatments with growth-regulating substances of the 2, 4-D group.** *Science* 1949, **110**, 235-6, bibl. 2. [Dept Bot., Cornell Univ., Ithaca]

The effect of growth-regulating substances of the 2,4-D group on the anatomy of bean and nut-grass plants is described. It is pointed out that though injury in nut grass is much less conspicuous externally than it is in the bean, because of differences in method of growth, the modifications brought about in both monocotyledon and dicotyledon are fundamentally the same.—T.D.H.

ECOLOGY

1001 MANN, H. H., and BARNES, T. W. **The competition between barley and certain weeds under controlled conditions. IV. Competition with *Stellaria media.*** *Ann. app. Biol.* 1950, **37**, 139-48, bibl. 4. [Woburn Expt Sta., Husborne Crawley, Bletchley]

When barley and chickweed are planted together, with abundance of water and nutrients for both, an increase in the density of barley planting reduces the loss due to chickweed competition, but even with very close-planted barley, the loss caused by the weed amounts to nearly two-thirds of the total fresh weight and to four-fifths of the grain yields. This is much greater than with the two annual weeds previously studied (spurrey and mayweed). In a sparse crop of barley, an increase in chickweed cover may reduce the barley to less than 10 per cent of its growth without the weed, while the chickweed itself is relatively little affected by the presence of the barley. There is no evidence of any specific effect of the roots of the one plant on the other. Comparisons are made with other annual weeds previously studied and it is suggested that the method adopted furnishes a means of assessing the relative effectiveness of these weeds in competing with barley. [See also *Herb. Abstr.* 18. Abs. 520.]—From authors' summary.

1002 RAABE, E. W. Der Zeigerwert der Ackerunkräuter im östlichen Holstein. [**The indicator value of arable weeds in eastern Holstein.**] *Biol. Zbl.* 1949, **68**, 471-88, bibl. 26. [Univ. Kiel]

The weed species vary according to quality of the soil, type of cultivation and climate. The study has been made from the ecological standpoint.—D.B.

1003 KRETSCHMER, G. Wachstum-Messungen an Pflanzen auf dem Acker. [**Growth measurement of arable crops.**] *Z. PflErnähr. Düng.* 1949, **47**, 213-36, bibl. 2. [Agricultural Meteorological Experiment Station, Buchenbühl]

A discussion of measurement of crop plants and of the relationship between growth, weather and microclimate.—D.B.

1004 PORTÈRES, R. La notion d'un climax de domestication et les systèmes de culture. [**The conception of a domestication climax and cultural systems.**] *Bull. agric. Congo belge* 1949, **40**, 2141-6.

Under cultivation, the natural climax (environment and living organisms in equilibrium) is replaced by a domestication climax (an artificial equilibrium of cultivated plants in a semi-artificial environment). In the tropics there is an almost complete absence of conserving and improving methods in the agriculture practised by natives and, to a greater extent, by Europeans. There " all have deeply modified the natural ecological complexes and are incapable of maintaining the domestication ecological complex necessary for their production."—E.B.

1005 PENMAN, H. L. **Evaporation in nature.** *Rep. Progr. Phys.* 1948, **11**, 366-88. [Rothamsted Exp. Sta., Harpenden, Herts.]

An historical survey of the scientific study of evaporation and the theory of evaporation (including the aerodynamic approach, and energy balance) are described. Evaporation measurements from open water, bare soil, and cropped soil of homogeneous and catchment areas are considered.—S.D.

TAXONOMY

1006 BERGAL, P. Les lodicules et leur utilisation dans la systématique du genre *Hordeum.* [**Lodicules and their use in the taxonomy of the genus *Hordeum.***] *Ann. Sci. Nat. Botanique* 1948, **9**, 189-269. [Société d'Encouragement de la Culture des Orges de Brasserie et des Houblons en France, 25, Boulevard Malesherbes, Paris 8]

A general account is given of the position, morphology, anatomy, and function of the lodicules during flowering. This is followed by a detailed morphological study of these organs in species and varieties of *Hordeum.* The author presents his classification of species based on the principal characters of the lodicules.—D.B.

1007 PORTÈRES, R. Articulation intraspécifique homologue et origine monophylétique de chacune des espèces *Oryza sativa* L. et *O. glaberrima* St. [**Homologous intraspecific subdivision and monophyletic origin of each of the species *Oryza sativa* L. and *O. glaberrima* St.**] *Rev. Bot. appl.* 1950, **30**, 147-57, bibl. 19.

1008 ROBERTY, G. Nomenclature et taxonomie de quelques cotonniers anormaux. [**Nomenclature and taxonomy of some abnormal cottons.**] *Cot. Fib. trop.* 1949, **4**, 88-93.

The author reports on research carried out by R. L. Knight, geneticist, of the Empire Cotton Growing Corporation, in Anglo-Egyptian Sudan. The general systematics of cotton is discussed and some abnormal forms are described, one of which was obtained by treatment of plants with concentrated DDT.—E.B.

1009 SAMPATH, S., and RAMANATHAN, K. **Chromosome numbers in Indian economic plants —III.** *Curr. Sci.* 1949, **18**, 408-9. [Agric. Res. Inst., Coimbatore]

The plants dealt with include members of the

Leguminosae and Gramineae. See *Plant Breed. Abstracts*.—K.O.

1010 GARBER, E. G. **Cytotaxonomic studies in the genus *Sorghum*.** *Univ. Calif. Publ. Bot.* 1950, **23**, 283-362.

1011 ROMERO, J. P. Claves para la clasificación de las variedades de *Phaseolus vulgaris* (L. ex p.) Savi. [**Keys for the classification of the varieties of *Phaseolus vulgaris* (L. ex p.) Savi.**] *Bol. Inst. Invest. agron.* 1949, **9**, 557-68.

BOOKS AND PERIODICALS

1012 KNIGHT, R. L., and BOYNS, B. M. **Agricultural science in the Sudan.** 22 × 14, pp. 256, Arbroath: T. Buncle and Co., Ltd., 1950, 20s.

The main title on the cover of this book is somewhat misleading; but its sub-title, a bibliography with abstracts, which is found on the title page, makes the nature of the book perfectly clear. It is a comprehensive bibliography, supported by abstracts of varying length, of all that has been published in the field of agricultural science in direct relation to the Sudan. In addition to agriculture in all its phases, the volume covers those subjects which have a bearing on agriculture, whether in the field or in the laboratory; thus such allied subjects as forestry and ornithology have been included. Abstracts from annual reports have as a rule been excluded, but the hope is held out that a sister volume to cover these will be published later. The emphasis throughout the book is mainly on cotton grown under irrigation, as might be expected. The abstracts used are largely from the original authors' summaries, but many have been written by R.L.K. and B.M.B.; while a certain number are taken from abstract journals of the Commonwealth Agricultural Bureaux. There is a good subject index and a short glossary of vernacular names. We recommend this book, not only to the research worker in the Sudan, but to all agriculturalists working in countries where similar conditions and problems are found. The book forms a valuable adjunct to that excellent compilation *Agriculture in the Sudan*, edited by J. D. Tothill (see *Fld Crop Abstr.* 2, Abs. 1456).—A. G. G. HILL.

1013 HAGEDOORN, A. L. **Plant breeding.** 25 × 14, pp. 237, 10 figs, 4 pls, London: Crosby Lockwood and Son, Ltd., 1950, 12s. 6d.

Though we tend to think of Dr. Hagedoorn as in some ways the grand old man of animal breeding, he explains in his introduction that he started his career as a plant breeding consultant with the firm of Vilmorin Andrieux in Paris. The fact that he has spent the major part of his life primarily as an animal breeder makes his book *Plant Breeding* in some ways more interesting. It keeps us very close to the ground, with few flights of fancy into the upper realms of polyploidy, induced mutation and the rest. The explanations of genetical principles are reduced to quite brief essays of sometimes not more than a couple of pages and the greater part of the book is taken up with practical advice to would-be breeders. He emphasises that many breeding projects have failed for the simple reason that an insufficiently large population of the segregating generations was studied to make it possible for the desirable combinations of characters to present themselves. The method advocated by the author for breeding self-fertilized plants is described on p. 79 as follows: " . . . make fewer crossings, choose the material well, do all we can to make the hybrid plants produce a great number of seeds and to sow an enormously large second generation. A preliminary selection in this second generation will help us to reduce the number of lines, and after this we may very well leave things for a few generations . . ." And for vegetatively propagated plants he says: " I am firmly convinced that a plant-breeder who makes a speciality of just sowing large numbers of seeds produced on his plants of good commercial clones will have a better chance of success than the man who is continually cross-breeding his plants." So convinced is Dr. Hagedoorn of these principles that they tend to be repeated, sometimes in almost identical words, in the different chapters which deal with advice for breeding the various categories of plants. In fact some of these chapters read more like jottings in a notebook than a treatise on breeding methods and the author himself confesses that the division of his material " is no more 'systematic' than the well-known classification of hats into black hats, felt hats and Sunday hats"! Much of the advice is designed for enthusiastic amateurs and an interesting reference is made on p. 28 and again on p. 217 to a scheme in Holland where farmers are furnished with breeding material of potatoes by the central Plant Breeding Institute and make their own selections.

Like an honest doctor, the author makes no secret of how much he leaves to Nature. " The best results in plant breeding "—he writes on p. 115—" are almost invariably obtained by a combination of natural selection and artificial selection." Nor does he ascribe any exaggerated value to elaborate statistical methods or experimental designs. The chapter on "Methods of Evaluation and Comparison" occupies six pages and the crux of what he says is contained in the statement: "I am fully convinced that in certain circumstances calculations of means and averages and probable errors will help the breeder. On the other hand, no amount of painstaking calculations will help us if the basis upon which those calculations are built is insufficiently good."

The book is written in good English though somewhat repetitive and restricted in style and contains a certain number of continental terms such as plant lice for aphids, castration for emasculation, and continental spellings such as theosinthe for teosinte. It is however eminently readable and at the relatively modest price of 12/6 can be recommended to a wide circle of students and more general readers.—(From *Plant Breeding Abstracts*.)

1014 MASEFIELD, G. B. **A short history of agriculture in the British colonies.** pp. viii + 179, Oxford: Clarendon Press, 1950, 10s. 6d.

This is a short but readable account of the development of agriculture in the existing British colonies. Although the book is largely concerned with the history of plantation crops, the part played by peasant agriculture and the uses and importance of live stock in the development of mixed farming systems are clearly traced. The author shows the growing awareness of the need for a resting ley in tropical agriculture, the appalling dangers which result from heavy overstocking, and the efforts made to combat this.

Each section of the book has a short bibliography and the work can be recommended for those who wish to improve their knowledge of colonial agriculture.—J. P. MAULE.

1015 SCHAD, C., MAYER, R., and HUGUES, P. Le soya—caractères, classification des variétés. [**Soybean—its characteristics, and classification of varieties.**] 27 × 17, pp. 127, 10 col. pls. Paris: Imprimerie Nationale, 1947.

This is mainly a literature review of the morphological and physiological characters by which *Glycine soja* is classified into varieties. The review is followed by two keys for determining varieties and by tabulated and classified information on thirty-eight varieties arranged alphabetically. This information concerns origin, synonyms, morphology, physiology (earliness, resistance to heat, protein and fat content) and use. Ten coloured plates illustrate colour of seed, gradations in mottling, shade and shape of pods, types of inflorescence, flower colour and hairiness and the colouring of seedlings.—D. BROWN.

1016 ABERYSTWYTH AND OXFORD COMMONWEALTH AGRICULTURAL BUREAUX. Joint Publ. No. 14. **The establishment of vegetation on industrial land.** By *R. O. Whyte* and *J. W. B. Sisam*. 22 × 14, pp. xiii + 78, 60 pls, bibl. 83, Aberystwyth: 1949, 10s.

In this work the authors discuss the problem of establishing vegetative cover on sterile, and sometimes toxic, industrial waste land. The technique of reclamation is based either on establishing of pioneer plants on "soil" of low nutrient value, or on the improvement of that soil by the addition of appropriate organic matter and fertilizers before sowing or planting.—E. B. HUGHES.

REPORTS

1017 SWITZERLAND. Federal Agricultural Chemical Institute, Liebefeld-Bern. Report of activities of the Station for the year 1947-1948. *Landw. Jb. Schweiz* 1949, **63**, 299-320.

The first part of the report is a record of samples examined, the samples being chemical fertilizers, soils (for determining their fertilizer requirements), and fodders such as cereals, by-products of industry, silage, grass and hay. The report on experiments, condensed into a short summary, deals mainly with the results of fertilizer and cultivation practices on certain crops, the use of growth regulating substances in the control of weeds in arable crops and grassland, and the control of insect pests. A list of publications by the staff of the Institute concludes the report.—D.B.

1018 CYPRUS. Annual Report of the Department of Agriculture for the year 1948. Nicosia, 1949, pp. 11.

See also *Herb. Abstr.* 17. Abs. 565.

Investigations reported:

Disease resistant wheat varieties. In breeding for rust resistance, local × exotic crosses have proved sufficiently promising for more extension trials. Hybrid "Yannaki No. 1" is being multiplied as rapidly as possible. The Egyptian wheat variety "Giza 4" has shown promise for light soils (p. 9).

Wheat and hay or seed legume rotations. In two-course rotations a leguminous hay crop depleted the soil as much as a leguminous seed crop. Green manure crops, although increasing the wheat yield sometimes by as much as 20 per cent, were not preferable to a fallow. The cost of growing and turning in the green manure was too great (p. 9).

Nitrogenous manuring of wheat. Increased yields were obtained mainly from late applications of nitrogen (p. 9).—C.W.S.H.

1019 INDIA, UNITED PROVINCES. Annual Administration Report of the Department of Agriculture for the year 1946-47. Allahabad, 1948, pp. 83.

Following an account of the year's rainfall and general climatic conditions, there are details of the area and yield of its principal crops. Fourteen different schemes have been partly financed by the province and the results of their progress are described in turn. Agricultural research is divided into six main sections under: sugar cane; rice, cereals and potatoes; oilseeds, millets and pulses; cotton; agricultural chemistry; and plant pathology. An initial trial was made to test the possibilities of taking two crops of paddy from the same land in one season. An early variety was sown in April and harvested three months later while a late variety was transplanted in the first week of August and harvested at the end of November. By this double cropping yields were considerably improved. Where irrigation water and fertilizers are available this method provides a promising means for growing more food per acre. During the year the wheat crop was severely attacked by rust and the comparative susceptibilities of different varieties were highly revealing. Varietal trials of wheat and barley were continued and experiments were conducted to discover the best sowing date for barley. Varietal trials with different oilseeds, pulses, and other crops have enabled certain improved seed types to be recommended and distributed to various research stations in India and abroad.—M.E.E.

1020 PAKISTAN, Ministry of Food, Agriculture and Health, Karachi. Report to the Food and Agriculture Organisation of the United Nations. 1949, pp. 32.

1021 CANADA. Department of Agriculture. Cereal Division, Central Experimental Farm, Ottawa. Progress Report 1938-1948. 1950, pp. 77.

The Report reviews work carried out at the Cereal Division Central Laboratory, Ottawa, the Cereal Breeding Laboratory, Winnipeg, and work carried out under the technical direction of the Cereal Division in co-operation with the Branch Stations and Farms all over Canada. The Central Laboratory report reviews work carried out on spring wheat improvement. The breeding programme has resulted in the production of Saunders, an early variety for the northern parts of the Prairie Provinces, Coronation, Coronation II, Regent, Redman and Saunders for eastern Canada, the sawfly-resistant variety Rescue for Saskatchewan and Alberta, the soft white wheat Cascade and the improved winter wheats Cornell 595 and Rideau. Wheat and flour quality investigations are summarized. The oat improvement programme has produced Brighton (hulless), Beaver, Beacon, Larain and Abegweit. Studies of oat lodging are summarized. Of over 100 varieties tested for grey speck resistance on manganese deficient soils, only the varieties Gopher, Mabel, Exeter, and Same proved highly resistant. The barley programme has produced Montcalm and the flax programme Viking, Victory, Rocket, Dakota and Sheyenne. Work on buckwheat (*Fagopyrum esculentum*) and safflower (*Carthamus tinctorius*) is briefly noted. The Dominion Cereal Breeding Laboratory report gives brief details of work carried out on the breeding of disease resistant common and durum wheats and oats, and work on *Triticum vulgare* × *Agropyron elongatum* crosses. An appendix contains a list of the active Cereal Division projects under way in 1948.—P.J.B.

1022 CANADA, Department of Agriculture. Division of Forage Plants. Central Experimental Farm, Progress Report 1937-1948. Ottawa, 1950, pp. 98.

Part 1 of the Report contains the report of the Central Experimental Farm, Ottawa. Progress in maize breeding is reviewed. Until 1938 all maize planted in Canada was open-pollinated; 10 years later, in 1948, 95 per cent of the entire husking maize acreage was planted to hybrid maize. The development of hybrid maize growing over this period is briefly reviewed. The performance of Canbred 150 and 250 is compared with that of Minnesota 13, an open pollinated type; the hybrids yielded 14.7 to 27.3 per cent more shelled maize per acre. Comparative data are given for the maturity, height and yield of the experimental hybrid OX 201, Canbred 150 and 250, and Canada 240 and 255; 3 years' results showed that OX 201 consistently outyielded the other hybrids tested. Performance data are given to compare experimental flint × flint hybrids with Canbred 150 and Canada 240; the dent hybrids gave relatively good yields, but were poor in ear height and plant type. Progress in soybean breeding is reviewed. Data are given of 4 years' testing of eleven of the standard soybean varieties and strains; Mandarin headed the list in order of seed yield. A table summarizes the important effect of environment on the protein and oil content of soybean seed and the correlation between high protein and low oil yield, and *vice versa*, is clearly brought out. Studies are reported on the influence of stage of maturity at harvest on the yield and quality of sugar beet seed; it was concluded that the best date of harvesting was 12 to 18 days after the first sign of ripening became apparent. Studies are also reported on the effect of immaturity and artificial drying on the quality of seed corn and the influence of stage of maturity and time of threshing on the quality of soybean seed.—P.J.B.

1023 QUEBEC. Dominion Experimental Station. Progress Report 1936-1946. Lennoxville, 1950, pp. 89.

The Field Husbandry section reports tillage trials to compare 4 and 7 in. deep ploughing. Results over 14 years show that on light soils, for crops such as maize and oats, deep ploughing is not necessary. In trials to compare five different preparations of sodland for grain and maize, results indicated that after-harvest cultivation was advisable only where *Agropyron repens* and other weed eradication was necessary ; on light soils there were little differences in yields following spring or autumn ploughing. Data are reported of trials with different rates and types of fertilizer on the yield of oats and barley. The Cereal section reports performance data of five leading oat varieties in Quebec over 1942-46 inclusive ; in order of yield, Roxton was top with 91.7 bu. per acre, followed by Ajax, 86.4 bu. per acre, Vanguard, Beaver and Mabel. In varietal trials on barley over 1941-46 inclusive, Byng was first in order of yield, with 55.7 bu. per acre, followed by Montcalm, 52.5 bu., O.A.C. 21, 49.0 bu. and Velvet, 48.9 bu. per acre. Mixed grain and wheat production trials are also reported. In winter rye trials, Prussian, Horton and Imperial were the top yielders. In field pea trials over 1936-41 inclusive, Early Blue was the highest yielder, followed by Arthur and Chancellor. Data are given of fibre and seed flax trials. In grain millet trials, Siberian was the top yielder with 59.5 bu. per acre, followed by Empire, 57.1 bu. and Crown, 18.8 bu. per acre. In sunflower trials, Mennonite produced 59.8 bu. per acre of seed and Sunrise, 44.5 bu. per acre.—P.J.B.

1024 ALBERTA. Dominion Experiment Station. Progress Report 1937-1946. Lethbridge, 1949, pp. 91.

The Field Husbandry section reports work on the development of cultural practices to control soil erosion in Alberta. Data are given of the grain and maize yields of nine different rotations ranging from continuous wheat to a 10-year rotation. The results of trials to determine the proper use of irrigation for wheat, sugar beet, barley and field peas and beans are reported. Work on sugar beet rotations for use on irrigated land is summarized ; particular emphasis is laid on the restoration of soil fertility following the heavy drain on soil nutrients by irrigated sugar beet. Trials to determine the best of six ways of managing *Melilotus alba* summer fallow in a 4-course rotation of beet, beet, wheat and seeded *M. alba* summer fallow are summarized ; highest sugar beet yields followed the ploughing in of the *M. alba* in the bud stage, though lower sugar beet yields following the ploughing in of *M. alba* after one or two hay crops had been taken, were amply compensated for by the value of the hay. A catch crop of canning maize, taken after the *M. alba* was ploughed in, gave high maize yields without significantly lowering the subsequent sugar beet yields. Data of sugar beet varietal tests for 1937-46 are reported. Work on the cultural and chemical control of weeds with sodium chlorate, carbon disulphide and 2,4-D is reviewed. The Cereal section report gives details of varietal tests with winter ryes and winter wheats. Among winter wheats, over 1941-46 inclusive, Kharkov M.C. 22 yielded 35.3 bu., Yogo 35.0 bu. and Jones Fife, 33.6 bu. per acre. Among spring wheats, Thatcher headed 10-year averages with 33.2 bu., followed by Reliance, 32.7 bu., Red Bobs, 31.9 bu. per acre, Canus and Marquis E 32. Among oats tested over a 9-year period, Erban was the top yielder, with 39.6 bu., followed by Legacy, 56.8 bu. and Victory, 53.3 bu. per acre. 8-year barley yield averages were headed by Trebi, 57.7 bu., followed by Newal, 56.3 bu., Sanalta, 50.8 bu., O.A.C. 21, 41.7 bu. and Olli 40.0 bu. per acre. 10-year flax averages were headed by Royal, 13.0 bu., Bison, 12.1 bu. and Redwing, 9.8 bu. per acre. Varietal tests of hard and soft spring wheats, winter wheats, oats, barley, flax, and field peas and beans grown on irrigated land, are reported. The District Experimental Sub-stations report gives brief details of a fallow-flax wheat rotation for sawfly (*Cephus cinctus*) control ; the rotation has proved satisfactory for sawfly control and crop yields have been reasonably good.—P.J.B.

1025 ALBERTA. Dominion Experimental Station. Progress Report 1937-1946. Lacombe, 1949, pp. 91.

The Cereal section reports data of 4 years' trials to determine the optimum rates of seeding in terms of the earliness, height, straw strength and yield of Reward wheat, Legacy and Victory oats and Trebi barley. Results from all crops indicated that an increase of seeding rate from 0.5 bu. to 3 bu. per acre advanced maturity by three days and increased the risk of lodging damage. Data are given of variety tests on spring wheat, oats, barley and flax. Brief notes are given of the following spring wheat varieties : Marquis, Thatcher, Red Bobs, Regent, Redman and Saunders ; for the winter wheat variety Kharkov ; for the oat varieties Victory, Eagle, Legacy, Ajax, Larain, Beaver and Garry ; for the barley varieties O.A.C. 21, Olli, Newal, Sanalta, Titan, Montcalm and Warrior ; the flax varieties Bison, Red Wing and Royal. The

Field Crops section reports the results of rotation studies on the mixed farming black soil zones of central and northern Alberta. Data are given of the average yields and profits per acre of a 3-year grain rotation, a 6- and a 7-year mixed farming rotation. Seven year averages are given of the yields of sequence of crop trials and notes of the influence of different crop sequences on weed control are summarized. Data collected from cover-crop experiments indicate that the ideal summer fallow on the park belt should receive shallow tillage with as much trash cover left on the soil as possible and a cover-crop of wheat or oats, sown about August 1st, to give wind erosion control in autumn or spring.—P.J.B.

1026 ALBERTA. Dominion Experimental Station. Progress Report 1937-1947. Beaverlodge, 1949, pp. 106.

The Cereal section report gives brief notes and crop test data of the following varieties grown in the Peace River district of Alberta: the hard red spring wheats Thatcher, Red Bobs, Garnet, Saunders, Reward, Regent and Redman; the oat varieties Victory, Ajax, Banner, Beaver, Garry, Larain and Legacy; the barley varieties O.A.C. 21, Montcalm, Olli, Newal, Titan and Warrior; Redwing flax; the field pea varieties Chancellor and Early Blue; Kharkov winter wheat and Dakold winter rye. Cereal breeding progress at Beaverlodge is briefly reviewed. Bunt has been serious in the Peace River area on Red Bobs wheat; it is hoped to replace this variety by the moderately resistant variety Saunders. The Field Husbandry section reports work on fertilizer applications to cereals in which light early spring applications of ammonium phosphate (11-48-0) at rates of 20 to 35 lb. per acre have raised wheat yields by as much as 5 bu. per acre. Data are given of crop yields in wheat-wheat-oats and wheat-wheat-oats-clover rotations following farmyard manure and fertilizer treatments. Trials have shown that there was very little difference in wheat yields following *Melilotus alba* ploughed in with the tops as green manure and *M. alba* stubble ploughed in as soon as possible after haying; both practices raised yields higher than aftermath ploughing in autumn or early the following spring. Experiments indicated that *M. alba* would serve as a summer fallow substitute; the procedure was to hay the clover and plough the stubble under; the yield of wheat the following year was higher than that following conventional summer fallowing. Seeding method trials, with and without nurse crops, are reported; data of trial results using different varieties of wheat, oats and barley as nurse crops are given. Weed control trials with sodium chlorate, Sinox and 2,4-D are reported. Couch grass and toadflax (*Linaria* spp.) were eradicated by 2.5 lb. per sq. ft. of sodium chlorate applied at the full growth or budding stage and a further 2.5 lb. per sq. ft. applied before the autumn freeze up. The use of 2,4-D in perennial weed control is briefly reviewed; a selected list of weeds and crops classified according to their 2,4-D susceptibility is given. The Illustration Stations' report includes details of various rotation and fertilizer experiments.—P.J.B.

1027 MANITOBA. Dominion Reclamation Station. Progress Report 1936-1947. Melita, 1949, pp. 31.

The Field Husbandry Department reports the results of various soil erosion control experiments. The planting of shelter belts and intersectional hedges and the practice of strip farming have all proved valuable soil erosion control measures. The most effective soil erosion control measure in Manitoba grain land was the maintenance of a trash cover on summer-fallow land; the broad-share cultivator proved better than the one-way disc in destroying weed growth and in leaving stubble and weed trash on the soil surface. Trials to compare the effect of binder and combine stubbles on soil drift showed that there was little difference between the two in the extent of erosion control resulting, but that in a summer-fallow/wheat/oats rotation, the binder stubble yielded 48 bu. per acre of oats compared with 33.7 bu. per acre for combine stubble. Trials to determine the best stubble land tillage preparation on light soil showed that soil-moisture conservation and crop yields were better if tillage was left until spring. Data are given of a number of crop rotation experiments. Trials with 2,4-D to control leafy spurge (*Euphorbia* spp.) are reported; complete control has not yet been secured. The most effective tillage method used in couch grass (*Agropyron repens*) eradication trials was the persistent use of a stiff-tooth cultivator with narrow tines. Data of cereal variety tests are given and include performance data of the wheat varieties Regent, Renown, Thatcher, Redman, Mindum, Carleton and Stewart; the oat varieties Ajax, Vanguard, Exeter, Gopher, Brighton, Laurel, Beaver, Beacon and Garry; the barley varieties Br. 112, Plush, Sanalta, Montcalm, O.A.C. 21, Wisc. 38, Titan, Vantage, Br. 1136, 1239 and 1896; and the flax varieties Royal, Redwing, Bison, Viking and Rocket. Data are reported of the effect of different seeding rates and dates on the yield of hard red spring wheat, durum wheat, Plush barley and Ajax oats.—P.J.B.

1028 MANITOBA. Dominion Experimental Station. Progress Report 1938-1946. Morden, 1949, pp. 87.

The Forage Crops section reports maize varietal tests in southern Manitoba, where the short season hybrids Nodak 201, Wisconsin 240 and 255 have proved more dependable than longer season hybrids; Wisconsin 240 performed particularly well. Work on the breeding of early hybrid maize is briefly noted. Sunflower trials are reported; data given show the superiority of the hybrid Advance over the open pollinated varieties Sunrise and Mennonite, both for yield and oil content of seed. Soybean, sorghum and millet trials are briefly noted. The Field Husbandry section gives detailed reports of 12 years' trials with five different rotations; data of crop yields and profit per acre are given. The Cereal section reviews briefly the spring wheat varieties Redman, Regent, Renown and Thatcher and the durum varieties Carleton, Stewart and Mindum. Over a 4-year period, Thatcher headed the averages for yield with 47.8 bu. per acre, followed by Redman and Regent with 45.9 and 41.5 bu. per acre, respectively; of the durums, Stewart rated highest for yield with 66.8 bu. per acre, followed by Carleton and Mindum. The oat varieties Ajax, Exeter, Vanguard, Garry and Victory are briefly reviewed. Over an 8-year period, Ajax topped the yield averages with 94.9 bu. per acre, followed by Exeter and Vanguard; Garry yielded 98.3 bu. per acre over a 2-year period. Plush headed the list of barley varieties for yield over a 7-year period with 68.2 bu. per acre, followed by Newal; Vantage yielded 83.7 bu. per acre, followed by Titan with 74.3 bu. per acre, both over a 3-year period. Of flax varieties tested, Rocket yielded best over a 5-year period, with 30.2 bu. per acre, followed by Royal with 28.9 bu. per acre, Victory and Dakota. —P.J.B.

1029 BRITISH COLUMBIA. Dominion Experimental Station. Progress Report 1937-1946. Saanichton, 1949, pp. 68.

The Cereal section reports winter wheat trials over the 10-year review period. Of forty-three varieties tested, none was superior to the old standard variety Sun, which averaged 42.4 bu. per acre, though over a 2-year period, Cascade out-yielded Sun by 5.5 bu. per acre. Of spring wheats tested over the same period, Cascade was the top-yielding soft white wheat; Marquis was the highest yielder among the hard red varieties. After a long period of research, it has been definitely established that the autumn seeding of barley is preferable to spring seeding in south Vancouver Island conditions. Two years' average yields showed no significant differences in yield between the standard winter-sown barley varieties Cape, Coast, Mariont B and Trebi. Of thirty spring barley varieties tested, Trebi, with an average yield of 47.1 bu. per acre and Plush, 41.9 bu. per acre, have given the best yields; among 2-row varieties Hannechen was the top yielder, with 37.6 bu. per acre. Of thirty-six winter oat varieties tested, Winter Turf has given best yields with 68.2 bu. per acre during the period under review, followed by Lee, 65.6 bu. per acre and Fulwin, 63.4 bu. per acre. Among spring oats tested, Victory, Erban and Ajax have given the best results; Beaver is the most promising of forty new varieties tested. Sugar beet, mangold and turnip seed production is briefly reviewed.—P.J.B.

1030 SASKATCHEWAN. Dominion Experimental Farm. Progress Report 1937-1946. Indian Head, 1949, pp. 60.

The Cereal section report reviews spring wheat developments in southern Saskatchewan. Thatcher has proved superior in yield to all other varieties in the drier areas; in moister areas Regent has outyielded Thatcher. Among the durum wheats, Pelissier has outyielded Mindum over the period 1939-46; Stewart, a stem- and leaf-rust resistant variety, is replacing Mindum, whose yield it has equalled over the period 1943-46. Among oat varieties, Banner and Victory have been largely replaced in turn by Vanguard and Ajax. Exeter is growing in popularity. Over a 7-year period, Exeter has topped the yield averages with 94.2 bu. per acre. followed by Victory, 93.5 bu., Ajax, 85.6 bu., and Vanguard, 85.4 bu. per acre. Among barley varieties tested over the period 1937-45, Plush has averaged a yield of 53.6 bu. per acre, Rex, 49.1 bu., Hannechen 49.0 bu., Prospect 44.2 bu., Newal 43.4 bu., and O.A.C. 21 35.3 bu. per acre; over 1943-46, Plush has averaged 58.2 bu., and Montcalm 51.9 bu. per acre. Among flaxes, Royal has topped the yield averages and is the most widely grown variety. Of winter rye varieties, Dakold 23 has yielded best and has shown good winter hardiness. In safflower (*Carthamus tinctorius*) tests, Pusa 2 matured earliest and was top yielder, with a 2-year average yield of 1304 lb. per acre, followed by Pusa 7, 1147 lb., and Karrar, 1083 lb. per acre. The Field Husbandry section reports investigations of summer fallow and stubble treatments, methods of sunflower culture and extensive wild oat (*Avena fatua*) eradication trials, in which results showed that surface working of the summer fallow, followed by deferred seeding, gave the best control. Manurial and fertilizer studies with maize and wheat and rotation studies are briefly summarized.—P.J.B.

1031 SASKATCHEWAN. Dominion Experimental Station. Progress Report 1936-1946. Melfort, 1949, pp. 72.

The Cereal section gives a review of developments in wheat production in north-eastern Saskatchewan. Thatcher has replaced almost all other wheat varieties grown. At Melfort, Redman has outyielded Thatcher by an average of 1.5 bu. per acre over a 3-year period, but on other parts of the Station territory, Thatcher outyielded Redman by an average of 3 bu. per acre. A new introduction, Saunders, has equalled Thatcher in yield over a 4-year period and was 4 days earlier in maturing. Of oat varieties, Ajax and Exeter have been the leading varieties; Garry has shown considerable promise. Among barley varieties, Montcalm has proved superior to O.A.C. 21 as a malting barley. Plush is probably the most widely grown variety in the area and, in 3-years' average, has outyielded Montcalm by 5 bu. per acre. Vantage and Titan have shown promise. The Field Husbandry section reports stinkweed (*Datura stramonium*) and wild mustard (*Sinapis* spp.) eradication trials. On summer fallow, increases in the seeding rate of wheat from 1 to 2.5 bu. per acre progressively increased the grain yield and lowered weed infestation where fertilizers were applied. On unfertilized plots, increases in the seeding rate did not raise grain yields. On stubble, the results were similar, but increases in seeding rates raised grain yields even on unfertilized plots. In tillage trials, results to date indicated that single or double harrowing shortly before wheat emergence gave the best stinkweed and wild mustard control. Wild oat (*Avena fatua*) eradication trials are reviewed. Data are given of the effect of different seeding rates on the yields of wheat, oats and barley, fertilizer trials with wheat, barley and oats and the effect of different summer fallow land treatments on wheat yields. The Illustration Stations' report summarizes investigations of the yield and characteristics of trials with eleven different crop rotations; particular emphasis is laid on the comparison of rotations which include legumes and hay with grain only rotations. Further studies on wild oat control are reported.—P.J.B.

1032 NEW BRUNSWICK. Dominion Experimental Station. Progress Report 1937-1947. Fredericton, 1949, pp. 101.

The Cereal section reports data of cereal variety tests. Cascade yielded highest among the soft wheats tested. Of the eastern rust group wheats, Huron Ott. 3 gave the best 11-year average yield, with 32.4 bu. per acre, followed by Coronation II, 31.4 bu. and Regent, 30.0 bu. per acre. In varietal tests of oats, over an 8-year period, Ajax yielded best, with 80.2 bu. per acre, followed by Victory and Erban; over the period 1944-47 inclusive, Exeter was the highest yielder with 83.2 bu. per acre, followed by Abegweit, 79.5 bu. Ajax, 77.8 bu. and Beaver, 74.8 bu. per acre. In the barley variety tests, the 11-year averages were headed by Byng, 54.3 bu. per acre and Olli, 50.2; over the period 1941-46 inclusive, Byng was again the top yielder with 54.4 bu. per acre followed by Montcalm, 50.4 bu. per acre, Velvet, Galore and Olli. Among the field peas tested, Early Blue headed the 11-year averages with 43.9 bu. per acre, followed by Arthur, Canadian Beauty and Chancellor. Of the field beans tested, Lapin headed the 8-year averages with 39.5 bu. per acre, followed by Burbank, Gohn's Rainy River and Navy Ottawa 711. Among the seed soybean varieties, Kabot was top of the 11-year averages with 26.4 bu. per acre, followed by Mandarin, Pagoda and Manitoba Brown. The Field Husbandry section reports data of crop fertilizer trials. Brief notes are given of weed control with 2,4-D in cereals; applications of 0.25 lb. of free 2,4-D acid controlled *Brassica nigra*, *Chenopodium* and *Polygonum persicaria*. Sweet corn variety tests are summarized briefly. Data are given of 3 years' trials to determine the effect of the date of application of borax on the incidence of brown-heart disease in turnips. Boron toxicity studies are summarized.—P.J.B.

1033 NOVA SCOTIA. Dominion Experimental Farm. Progress Report 1937-1947. Nappan, 1949, pp. 66.

The Cereal section report gives data of the average yields of the spring wheat varieties Cascade, Huron, C.D. 3285 and Coronation II for 1945-47 inclusive; Cascade gave the best yield, with 25.1 bu. per acre, followed by Huron with 24.3 bu. per acre. Of winter wheat varieties tested over the period 1932-42, Minturki and Kharkov 22 M.C. headed the yield average with 32.6 and 30.7 bu. per acre, respectively; fifteen new strains were tested in 1944, of which Rideau gave the best all-round performance; all proved very winter hardy. Data are given of the 10-year average yields of Erban, Victory, Banner, Abegweit, Beaver and Alaska oats; Erban was the top yielder and showed a high degree of crown-rust resistance. Of barley varieties tested in Nova Scotia over the period 1944-47 inclusive, Charlottetown No. 80 yielded best, with 41.1 bu. per acre, followed by Olli, 38.9, Montcalm, 38.8, Peatland, 37.8 and Galore, 36.9 bu. per acre. Seven year averages of field pea varieties were headed by Early Blue, 68.3 bu. per acre, Chancellor, 56.9 and Arthur, 52.5 bu. per acre. The Field Husbandry section gives data of crop responses to N, P, K, B and Mg and crop responses to farm-yard manure alone and with fertilizer. Weed control studies with 2,4-D are briefly noted. Among swede varieties noted, Wilhelmsburger has shown good clubroot (*Plasmodiophora brassicae*) resistance and strains with still better resistance are in course of development. Data are given of the effect of the size and spacing of swede roots on seed production; results showed that row spacings of 1 foot with large swede roots gave the highest seed yields. Of seed soybean varieties tested, Manitoba Brown has proved most satisfactory in terms of yield and maturity; in most years, higher yielding varieties were in danger of being frozen whilst still immature.—P.J.B.

1034 QUEENSLAND. Annual Report of the Department of Agriculture and Stock for the year 1947-48. Brisbane, 1948, pp. 92.

Notable events of the past decade include special war-time activities, increase of crop yields, breeding better crops, research on pastures and fodder plants, soil conservation, fodder conservation, study of agricultural climatology, organized marketing, improvement of extension services and co-operation in research.

The Report of the Agriculture Branch

Climatic conditions and details of crop production for wheat, maize, grain sorghum, sunflower seed, linseed, lucerne, soybeans, peanuts and cotton are described. Field trials were conducted with the majority of these crops and also with rice grass (*Spartina townsendii*), and sweet potatoes. Particular interest was shown in trials with linseed, a crop which has reached 5500 acres in 2 years and promises to become a major crop on the Darling Downs. Plant breeding and seed selection were applied principally to wheat, sorghums, cotton and maize. The main centre for wheat breeding was the Hermitage Experiment Station. Three important advances were made during the season namely: the initiation of a back-crossing programme for rust resistance; the introduction of replicated nursery field trials for new hybrid selections; and the large scale use of the Pelshenke test for quality testing in newly-bred material. New strains and varieties of sorghums and cottons were tested. The latest cotton introduction, Locket, when grown under irrigation on a sandy soil, yielded over 2000 lb. of seed cotton per acre. It has proved a prolific variety with fibre of good length and uniform strength.

Soil investigations at the various stations, and tropical pasture research at South Johnstone are also described. The most suitable grass-legume combinations for the tropical areas appear to be *Panicum maximum* with *Centrosema pubescens* and *P. maximum* var. *coloratum* with *Stylosanthes gracilis*.

Report of Regional Experiment Stations

At Hermitage, investigations were conducted with cereals, linseed, grain sorghum, pastures and miscellaneous summer crops and research on soil fertility and conservation was continued. Similar crop trials were conducted at Biloela where cotton investigations were an important feature. At Kairi wheat, oats and maize were included in the crop trials and a pasture nursery was developed where certain tropical grasses were tried. A new regional experiment station was ope[illegible] Ayr.

Report of the Science Branch

The diseases of wheat, linseed, peanuts and numerous other crops are described. The entomology report includes an account of *Lepidiota caudata* in pastures and *Heliothis armigera* and *Aphis gossypii* on cotton. Work by the botany section included the identification of noxious weeds and other plant material, and the mulga and western pasture studies.—M.E.E.

1035 Malaya. Mechanization. Quarterly Progress Report, April to June, 1950. *Malay. Agric. J.* 1950, **33**, 150-162.

The following trials are reported: Tractor and implement trials (pp. 158-160); Wet padi cultivation (pp. 160-1); Dry land cultivation (pp. 161-2).—N.G.S.

1036 Malaya. Notes on current investigations, April to June, 1950. *Malay. Agric. J.* 1950, **33**, 163-169.

The following are reported: Padi variety trials (163); The effect of growing off-season crops on padi (163); The control of padi stem borers with insecticides (164); Soya bean variety trials (Serdang) (167); Jute trials (*Corchorus capsularis* and *C. olitarius*) (168); Linseed tials (168-9).—N.G.S.

NEWS ITEMS AND SCIENTIFIC NOTES

ANSWERS TO ENQUIRIES

1037 Tangier Pea. The following note, with a bibliography, was sent by the Bureau to an enquirer who asked for particulars of this crop.

The Tangier pea, *Lathyrus tingitanus*, is an annual plant indigenous to North Africa. It has been grown and recommended as winter forage by Dr. Trabut of Algeria. Introduced into the USA about 1900 as chicharaca, it was found to be more resistant to frost and drought than are field peas, sweet clover or vetches. In USSR it has been grown successfully on poor, sandy soil at a temperature as low as −7°C. In parts of Australia where the annual rainfall is 16 in. *L. tingitanus* takes from 6 to 7 months to mature. Early autumn sowing in land prepared as for cereals is best. Seed rates from 8 to 30 lb. per acre are quoted. The seed can be broadcast, drilled or sown from a combine drill with 1 to 1.5 cwt. superphosphate per acre. Unless the soil already contains the necessary nodule bacteria the seeds must be inoculated with the appropriate bacterium before sowing. A mixture of 5 to 8 lb. of Tangier pea sown with 1 bu. of oats per acre is said to make an excellent hay or silage crop. Although the forage of this pea is nutritious and highly palatable to stock, there is evidence from America that its seeds contain a toxic substance which can cause lathyrism in rats. If Tangier pea is grown for seed, the haulms left after threshing compare favourably with oat and bean straw. When chaffed and moistened they are relished by stock. Tangier pea can also be used as a green manure crop.—K.O.

British Commonwealth

1038 The Central Sales Branch of the Commonwealth Agricultural Bureaux has been removed from Aberystwyth, its new address being Farnham House, Farnham Royal, near Slough, Buckinghamshire.

1039 The Bulletin of the Imperial Institute has ceased publication with Volume 46. Two journals are to replace it; Colonial Plant and Animal Products, and Colonial Geological and Mineral Resources.—N.G.S.

Great Britain

1040 The British Association for the Advancement of Science. The annual meeting was held in Birmingham from August the 30th to September the 6th, 1950. Notices and abstracts of relevant addresses will be found in this and subsequent issues.—N.G.S.

1041 Royal Society of Arts Prize. The Royal Society of Arts has recently announced that as part of the centenary celebrations of the Great Exhibition of 1851, which it originated, the Council proposes to award a gold medal and a sum of £500 for a new and outstanding contribution to the national economic recovery. The prize is to be offered for the best proposal for promoting the production or the economic utilization of food in Britain. Proposals submitted can be general, or they may be concerned with a particular branch or aspect of food production, e.g.: an overall plan; a scheme for encouraging return to the land; a system to ensure the marketing of perishable food in better condition. Entries must be well documented and the Council has therefore decided not to prescribe any fixed limit of length for written entries. The judges may require some practical demonstration of any mechanical device or process suggested.

Entries, which may be submitted by British subjects, citizens of the Commonwealth, those of the Irish Republic and foreigners permanently resident in the United Kingdom, must reach the Secretary of the Royal Society of Arts, John Adam Street, Adelphi, London, W.C.2., by March 1, 1951. *World Crops* October, 1950.—N.G.S.

1042 Aerial Top Dressing. On 31st August and 1st September, some members of the Bureau scientific staff visited Capt. G. L. Bennet Evans' farm on Plynlimon to watch a demonstration of aerial top dressing, by invitation from the Bristol Aeroplane Co. Ltd. Dressings of superphosphate and of lime were laid by a Bristol freighter, type 170, which carried 6 tons at a time, this quantity being disposed in two swathes. The effect was impressive, the spread being very even. The release of the fertilizer presents difficulties. Much depends upon an effective ground control, and on an accurate assessment of air currents, etc. The method presents great possibilities for use in remote and difficult areas, or even for very large acreages in less remote places.—N.G.S.

1043 Farm Buildings Conference. Subjects discussed at the Farm Buildings Conference held at Hitchin in January, 1950, included those dealing with grain conditioning, the principles underlying successful drying and storage, and the provision and adaptation of buildings for grain storage. Ventilated bin-type installations with sets of small bins, rather than with one or two larger ones, were recommended, as grain with a moisture content exceeding 20 per cent should not be more than 5 ft. deep. *J. Minist. Agric.* April, 1950.—E.B.H.

Northern Ireland

1044 Flax variety trials. A tabular summary is given of flax variety trials during 1933-48. The results show that pure strains are superior to commercial varieties. Stormont Gossamer and Liral Prince gave the most satisfactory results. Concurrent was considerably less remunerative than pure strain varieties because of its lower yield and lower quality fibre. *Mon. Rep. Minist. Agric. N. Ire.* March, 1950.—E.B.H.

1045 Seed oat certification scheme. An account is given of the experimental seed oat certification scheme introduced by the Ministry of Agriculture in 1948, which has resulted in the marketing in the spring of 1950 of 200 tons of Certified Pedigree Stormont Arrow, 137 tons of Stormont Iris and 22 tons of Stormont Tyrone Tawny. A new Swedish variety, Sun II (or Steel) and Stormont Grandee will be ready for 1952 sowings. *Mon. Rep. Minist. Agric. N. Ire.* May, 1950.—E.B.H.

France

1046 Colonial Scientific Research. An account of the work of the " Office de la Recherche Scientifique Coloniale, 22, Rue Oudinot, Paris," is given in the " Rapport d'activité pour les années 1946-47. A diagram illustrates both organization and activities in France and overseas. The following items from the report concern this Bureau. The " Institut d'Etudes Centrafricaines " (in course of formation) will have a central botanical laboratory at Brazzaville (Middle Congo) and stations of plant biology in Gabon, Ubangi-Shari and Chad. The " Institut français d'Afrique noire" (now " Institut Michel-Adanson") is a co-ordinating body among the various scientific institutes of French Africa. Other bodies in course of formation are the " Institut de Recherche scientifique" for Madagascar, situated at Tananarive, the " Institut français d'Océanie" in New Caledonia, and a research centre in French Guiana. The last-named is intended to work in conjunction with the International Institute for the Amazon region dependent on U.N.E.S.C.O. Reorganization of research centres is taking place in Indo-China. The services located in France include a service of documentation which is establishing international contacts. At the institute of Adiopodoumé (Ivory Coast) research is being carried out by Miège on *Dioscorea*. About 50 varieties of yams, belonging to 6 species cultivated in tropical Africa, are grown, also some wild species (not yet determined) collected in the region of Abidjean (Ivory Coast). Two missions to French West Africa have carried out phytogeographical surveys with the object of preparing vegetation maps.—E.B.

1047 In *Agronomie tropicale,* Jan.-Feb., 1950, an account is given of the reports presented to the Conference on *Manihot* and other tropical starchy plants, including yam and arrow-root, which was held at Marseilles from 24th to 26th September, 1949. The reports are concerned with cultivation and research in the French colonies.—E.B.

Italy

1048 HEMP. Although production of Italian hemp is still below prewar level, it reached 750,000 q. in 1949. Over half this amount was exported. Hemp is practically the only Italian fibre plant, and its cultivation is now in jeopardy owing to competition from imported cotton, jute and sisal. In consideration of the high number of workers the industry employs (one ha. under hemp requires from 1000 to 1200 working hours, including retting, or twice as much as for a ha. of wheat), it is hoped that a protective policy will be adopted. (From *G. Agric., Domen.,* No. 24, 1950).—E.B.

Anglo-Egyptian Sudan

1049 THE ZANDE SCHEME. This " experiment in social emergence" was planned in 1943 by Dr. J. D. Tothill to take place among the Azande tribe in the south-west corner of the Anglo-Egyptian Sudan. The agricultural aspects of the scheme have been reviewed by H. Ferguson, who has described the progress of the cotton industry which was initiated as the key project of the scheme. Strip cropping and the use of long-term grass or bush fallows have been adopted to deal with the erosion-susceptible soils and rather low fertility. Cotton yields have been higher than expected, partly due to native enthusiasm and to the comparative absence of pests. *Emp. Cott. Gr. Rev.* April, 1949.—M.E.E.

India

1050 GROUNDNUTS AND COTTON IN MIXED CULTIVATION. Experiments conducted at the Agricultural Research Station, Lam, Guntur District, in 1948 on the mixed cropping of groundnuts and cotton in the proportion of 8 to 1 respectively showed that the yield of bunch groundnuts was not affected and that the cotton gave yields ranging from 260 to 380 lb. of seed cotton per acre.—*Indian Cott. Gr. Rev.* October, 1949.—K.O.

Pakistan

1051 SCIENCE CONFERENCE. The second Pakistan Science Conference was held at Karachi in April 1950. Scientists from within Pakistan, and from other countries, presented papers on various branches of science. Abstracts from some of these are given in *Co-operation and Marketing Review,* 1950, Vol. 4. No. 3. pp. 242-253, including the following: Effect of various rabi treatments on the yield of paddy crop, by A. R. Pirzada; Varietal response to tillage treatments in American cotton in the Punjab, by M. Abdullah; Some studies on the weedicides in the Punjab, by Ghias-ud-Din Ahmad; C.141, a new barley variety for the Punjab, by S. Khan, *et al.*; Punjab wheats and their important characteristics, by S. Khan and A. R. Khan; Vicinism in cotton, by A. H. Khan and M. Afzal.—N.G.S.

1052 COTTON SEED. The Pakistan Government has introduced regular grade standards (Grade I, II and III) for the three classes of cotton seed (fuzzy, non-fuzzy, and desi). The standards depend on the quality factors, extraneous matter, defective seed, etc. Quality control (designed to protect the buyer) is exercised by Government inspectors who are responsible for checking and inspecting cotton seed prior to packing. Bags of seed conforming to grade specifications are marked with a " Pakmark" label, indicating its class, grade and crop year. Seed for export is again inspected at Karachi where a " Certificate of Grading" is granted to the exporter.—*Co-oper. Market. Rev., Karachi,* April, 1950.—K.O.

U.S.A.

1053 AIR BLAST FUNGICIDE APPLICATION. Fungicide concentrates suitable for air blast application have been developed at Rhode Island Experiment Station. The Bean-Cooley " Portomist " machine is fitted with a detachable 4-row boom equipped with 4 air nozzles 3 ft. apart over which are mounted 4 atomizing nozzles which discharge the concentrate as a flat fan into the air blast. The air blast is directed downwards at a 45° angle towards the rear of the tractor pulling the machine. Requirements in regard to velocity, and volume of the air stream are laid down. For safety in applying an oil solution of toxicants to row crops the largest droplets should probably not exceed 30 microns in diameter. Sufficiently fine oil-solution mists have not yet been secured, but fungicide-in-oil-water emulsions are not limited by droplet size and are more practicable. *Agric. Chem.* Feb., 1949.—K.J.S.

1054 PESTICIDE LABELLING REQUIREMENTS. The December, 1949 issue of *Agricultural Chemicals* gives a list of the labelling requirements, including warnings, caution statements and antidotes, for pesticides containing one or more of a list of seventy-one active (and toxic) ingredients.—K.O.

1055 NEW SOYBEAN PRODUCT. Gelsoy is a new, bland-tasting, proteinaceous soybean product developed at the Northern Regional Research Laboratory. It consists of the water-soluble fraction of unprocessed soybean flakes which have been washed in ethanol. It resembles egg white and should find an application in food industry and as an adhesive. *Soybean Digest* November, 1949.—E.B.H.

1056 RICE HULLS FOR SEEDING. In 1947, the Soil Conservation Service nursery, Pleasanton, Calif., discovered that rice hulls could be used as a " dilutant" to hold various seed mixtures together, so that several kinds of seeds could be evenly distributed in one operation, regardless of weight, shape and size. The hulls act as a cup in which clusters of seed become firmly trapped. The result on sowing was a vigorous, even stand of high-yielding forage. This was confirmed by further experiments carried out by the Eastern Alameda County Soil Conservation District. The process is extremely simple, and the husks may be bagged and stored almost indefinitely. *Soil Conserv.* July, 1949.—E.B.H.

Australia

1057 New Wheat Research Institute. The erection of a new Wheat Research Institute has been started at Wagga Agricultural College and Experiment Station, its estimated cost being £52,000. Work at the Institute will be directed towards breeding better varieties of wheat of high baking quality. *Agric. Gaz. N.S.W.* May, 1950.—K.O.

1058 Waite Agricultural Research Institute. The Institute was founded in 1924 by the University of Adelaide as a result of a gift of 300 acres of land by the late Peter Waite. Soil studies conducted by the Institute in co-operation with the C.S.I.R. were begun in 1927 and resulted in the publication of a soil map of Australia in 1944. Wheat breeding trials have resulted in the production of varieties Warigo and Glenwari, both resistant in their mature phases to stem rust, leaf rust and flag smut. The confirmation, by means of culture solutions, of the need for small amounts of Mn, Cu, and Zn to produce satisfactory growth of several economic species of plants (oats, barley, etc.) has led to the application of these elements to farm crops and pastures. Work is in progress on the biological control of pests, such as the lucerne flea (*Smynthurus viridis*), the Australian plague locust (*Chortoicetes terminifera*), the swarming grasshopper (*Austroicetes cruciata*) and the grain weevils, *Calandra oryzae* and *Rhizopertha dominica*. *Research*, 1949, 2, 373-7.—K.O.

New Zealand

1059 Seed Exchange, 1950. The Department of Scientific and Industrial Research, New Zealand, offers the following seed :

WHEAT
Triticum vulgare

var. Fife Tuscan	Intermediate
,, Cross 7	
,, Hilgendorf	
,, Tainui	
,, Jumbuck	
,, College Solid Straw Tuscan	
,, College Hunters	Winter
,, Dreadnought	

Correspondence should be addressed to : The Director, Botany Division, 8, The Terrace, Wellington, New Zealand.

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FIELD CROP ABSTRACTS

LAND UTILIZATION AND MANAGEMENT

1060 Gilchrist, J. A. **The changing West Country.** *Scot. J. Agric.* 1950, **30**, 1-5. [West of Scotland Coll. Agric.]

Mainly an economic survey of the changes which have taken place during 1913-1950 in the area bounded by Oban, Crieff, Langholm, Stranraer and the isles of Bute and those of the Argyllshire coast. —E.B.H.

1061 Zanini, E. L'agricoltura siciliana e le sue impellenti necessità. [**Sicilian agriculture and its urgent needs.**] 1947. pp. 31.

Information on the present critical condition of agriculture is given. The only possible remedies the author suggests are transformation of the large estates by establishing small holdings ; development of an intensive agriculture with higher forage production, and extension of irrigation wherever possible. A first group of irrigation works covering an area of 80,000 ha. is already planned. On the mountainous regions afforestation, pasture improvement and river control are problems to be solved.—E.B.

1062 Blewett, W. V. **The farming picture in Tropical Africa.** *World Crops* 1950, **2**, 370-4. [Imp. Chem. Ind. Ltd.]

This article is a shortened version of a lecture delivered before the Royal Society of Arts, describing some of the measures being taken to develop the resources of these areas.—From author's abstract.

1063 Gverra, G. Panorama geral da agricultura em Angola. [**General panorama of agriculture in Angola.**] *Agron. Angolana* 1949, **2**, 23-36. [English summary.]

1064 Bulletin Agricole du Congo Belge. Systèmes culturaux applicables à la production de plantes annuelles en zone équatoriale congolaise. [**Cultural systems suitable to the production of annual plants in the equatorial zone of the Congo.**] *Bull. agric. Congo belge* 1949, **40**, 1749-1813, bibl. 32.

This note was presented at the Conference on African Soils by the commission for fallow studies at the Research Centre at Yangambi (Belgian Congo). General information on the central basin of the Congo is given regarding climate, vegetation, and the agricultural methods practised by natives and Europeans. The crops, cultivation areas of which are given, include *Arachis*, *Oryza sativa*, *Coix lachryma-jobi*, *Zea mays*, *Manihot*, *Boehmeria nivea*, *Corchorus*, *Urena*, *Helianthus annuus*, etc. Rotations are described. The use of a leguminous plant on the fallow has generally proved unsuccessful. Only *Flemingia* is considered valuable as a legume on the plateaux. A study was made of the numerous species grown on the fallow and their effect on the soil and on the main crops. Two experimental fallow plots were covered for 3 years, one with *Panicum maximum*, the other with *Paspalum notatum*. Both species partially restored the soil fertility, but the crops which followed *Panicum maximum* gave better yields. Information on forest fallow is also given.—E.B.

1065 Henry, J., and Muller, J. Du mode de lotissement dans le paysannat indigène. [**Land tenure among the native peasantry.**] *Bull. agric. Congo belge* 1949, **40**, 1700-12. [I.N.E.A.C., Belgian Congo]

In view of the development of native agriculture in the Belgian Congo, the authors explain why the communal system is more suitable than the individual system.—E.B.

1066 South Africa, Department of Agriculture. Econ. Ser. No. 35. Bull. No. 275. **Agro-economic survey of the Union (II). (The five cropping regions of the winter-rainfall area.)** 1949, pp. 108.

Protection in the form of customs duties and a maximum tariff for wheat and meal has encouraged production in these five areas, which are : Swartland, Western Strandveld, Rûens, Lower Langeberg, and Duineveld. Each area is dealt with extensively, so that the survey is of an economic, land utilization, phyto-geographical, and social character. In all areas wheat is the most important source of income. Lower Langeberg is very favourable for sheep farming, and although many of the grazings have been converted to arable land, the sheep industry remains a major factor in the agriculture of that region. Lists are given for each region showing the main grasses and weeds. Share cropping as a system of tenancy is found in Rûens, Lower Langeberg and Duineveld, but is largely unsuccessful. The Duineveld region is the poorest ; so poor that its inhabitants may well become a State problem.—N.G.S.

1067 McIntyre, W. E. **Land utilization of three typical upland prairie townships.** *Econ. Geogr.* 1949, **25**, 260-74.

The agricultural development over the last century of Rooks Creek, Amity and Sunbury in the Illinois region of the Corn Belt is traced. Over this period the area has been transformed from unspoiled small wood and prairie land to a highly productive region where corn, oats, soybean and hay crops predominate. The present productivity and land utilization of the three townships are compared and related to the physiography, drainage and soils of the region.—P.J.B.

1068 PERU. Ministerio de Agricultura. La acción oficial en el desarrollo agropecuario de la colonización de Tingo Maria. Años 1942-1946. [**The official action in the agronomic development of the colonization of Tingo Maria between 1942 and 1946.**] Lima 1947, pp. 177, illus.

An account of the establishment of the experimental station of Tingo Maria, and brief notes on the various crops under investigation.—N.G.S.

FARMING SYSTEMS

1069 BALASUBRAHMANYAN, R. **Possibilities of fitting in cotton on the rice fallows of Tanjore delta in Madras.** *Indian Cott. Gr. Rev.* 1949, **3**, 167-70, bibl. 3. [Dept Agric., Madras]

An examination of current trials, meteorological data, irrigation facilities, soil types, and farming systems indicates that: (a) cotton is not to be recommended as an unirrigated summer crop, (b) Cambodia cotton sown later than the end of January will not fit in with the rice rotation or prove remunerative, (c) late-sown cotton will have set backs during hot weather on account of flower shedding, leaf yellowing and reddening, and imperfect boll development arising out of puddling or flooding of neighbouring fields following impeded drainage, (d) the crop life must be reduced to 5 months so as to remove the standing cotton by the end of June.—K.O.

1070 ROSE, M. F. **Possible crops for the cotton rotation in the Southern Jebels area of Kordofan, A. E. Sudan.** *Emp. Cott. Gr. Rev.* 1950, **27**, 261-74, bibl. 7.

As a means of restricting overstocking, continuous cropping, and erosion resulting from the development of the area, several crops are recommended for rotation with cotton. Food crops include dura (*Sorghum vulgare*), *Zea mays*, and dukhu (*Pennisetum typhoideum*), for grain: and simsim (*Sesamum orientale*), to a lesser extent groundnuts (*Arachis hypogaea*) and sunflowers (*Helianthus annuus*) for oil. Of the restorative crops cowpea (*Vigna unguiculata*) is the most useful. The rotation cotton/dura/cowpea, coupled with an effective cross-ridging system to minimize surface scouring, maintains a fair level of productivity. On worn out land where restoration of fertility under this system would be slow, soil regeneration by the established practice of seeding *harig* grasses is recommended. Seeds of grasses which are indigenous to the heavy clays (for example *Hyparrhenia pseudocymbaria* and *rufa*, *Brachiaria obtusiflora*, *Pennisetum mollissimum*, *Rottboellia exaltata*, and *Cymbopogon nervatus*) are collected by the cultivator and broadcast over his worn-out land prior to abandonment. These rapidly growing *harig* grasses soon cover the ground to the exclusion of other species. They remain for 4 or 5 years, during which time the soil regains fertility, then the cultivator returns and burns off the grasses and prepares the land for a suitable rotation.—K.O.

1071 GAUTIER, J. Quelque idées sur une organisation agricole de l'Afrique Centrale française. [**Some suggestions for an agricultural organization in French Central Africa.**] *Bull. agric. Congo belge*, 1949, **40**, 1585-1616. [Inst. Res. Cot. Text. exot., Paris]

The zones of this region, which includes French Equatorial Africa and the Cameroons, are classified according to their physical characters. The various factors which influence agricultural organization and development are analysed. Reference is made to *Imperata cylindrica* which is a noxious weed in the climate of Guinea, but less harmful in drier regions (Sudan). It is claimed that as it grows only under direct light, the best method for controlling *Imperata* on fallow land is to plant shade trees, for instance *Cassia siamea*.—E.B. [It is not true that this grass grows only in direct light; it can thrive in coconut plantations.—Ed.]

1072 STOFFELS, E. H. J. Les systèmes de cultures et la fertilité des terres. [**Farming systems and soil fertility.**] *Bull. agric. Congo belge*, 1949, **40**, 1562-70, bibl. 8. [Inst. agron. de l'Etat, Gembloux]

The evolution of agriculture from earliest times is explained, and a classification of farming systems is given.—E.B.

1073 MAHER, C. **Study of the farming systems in their relation to soil conservation.** *Bull. agric. Congo belge*, 1949, **40**, 1543-8. [Dept Agric., Kenya]

The possibility of introducing mixed farming in East Africa is examined. In the European farming areas of Kenya the practice of taking a grass fallow has developed, using *Melinis minutiflora*, *Chloris gayana* and, to a lesser extent, *Beckeropsis uniseta*. At higher altitudes *Bromus marginatus* is used and, to a lesser extent, *Phalaris tuberosa*. Some disadvantages are presented by *Cynodon* spp. On fallow land which has reverted naturally to grass the species are *Digitaria scalarum*, *Eragrostis* spp., *Rhynchelytrum repens* and *Pennisetum clandestinum*. The value of the bush fallow is considered. This latter practice is probably the only way of restoring fertility in semi-arid areas.—E.B.

1074 Kerkham, R. K., and Williams, E. **Grass fallow in Uganda. Rotations and effect of farmyard manure.** *Bull. agric. Congo belge* 1949, **40**, 1715-26, bibl. 3.

An account is given of experiments at Serere to determine what form of rotation gives the best crop yields over a limited period of years. Results, which are applicable only to regions with an environment and farming system similar to the region of the trials, have shown that: (a) yields are higher when the grass fallow lasts much longer than the cropped period; (b) a grass cover during the resting period is superior to an annual green manure; and (c) farmyard manure increases crop yields for about 2 years after application. The test crops employed were *Gossypium*, *Arachis hypogaea*, *Eleusine* and *Sorghum*. *Cynodon plectostachyum*, which grows naturally on grazed land in the region, was the species mostly employed for reseeding. *Mucuna nivea* was grown as a green manure. Soil left to natural revegetation grew a more or less pure stand of *Imperata cylindrica*.—E.B.

CONSERVATION PRACTICES

1075 Maher, C. **Soil conservation methods. (Including strip cropping and various mechanical anti-erosion methods.)** *Bull. agric. Congo belge*, 1949, **40**, 1549-56. [Dept Agric., Kenya]

Methods adopted in East Africa are reviewed. Contour strips planted with *Paspalum notatum* are useful in low rainfall areas. *Pennisetum purpureum* is employed for contour strips on steep land where it also supplies fodder. Among cover crops used on contour strips are sweet potato (*Ipomoea batatas*), *Dolichos lablab*, cowpea (*Vigna sinensis*), and *Eleusine coracana*. Terracing methods are explained.—E.B.

1076 Raeburn, C., and Preez, J. W. du. **Water resources, minor irrigation schemes and soil conservation: Jos Plateau, Nigeria.** *Bull. agric. Congo belge* 1949, **40**, 1537-42.

The possibility of irrigating with little water, a practice which has been particularly developed in coastal Mediterranean regions, is examined. Related systems are explained.—E.B.

1077 Lemaitre, C. Moyens propres à parer à l'usure des sols dans l'est du territoire du Niger. (Cercles de Gouré et de Nguigmi). [**Ways of preventing soil deterioration to the east of the Niger territory. (Districts of Goure and Nguigmi).**] *Bull. agric. Congo belge*, 1949, **40**, 1489-1518.

This region, which is in process of rapid agricultural evolution, is the northern limit of the non-irrigated crop area of the Chad basin. There are 8 months of drought and a rainy period from June to August. Information on crops, including varieties, is given. Millet is grown in 95 per cent of the area under food crops. *Vigna* is intercropped with millet or is grown alone. Irrigated crops, grown on a limited area, are *Triticum*, *Zea mays*, *Manihot*, *Gossypium* and various legumes. Animal rearing is practised, using primitive methods. Maintenance of natural vegetation is favoured by controlling fires, limiting the clearing of new land, and extending the forest cover. For maintenance of fertility on cultivated soil it is advisable to grow green manures. Because of the short rainy season a grass is more suitable for this purpose than a legume. The practice of planting trees on the fallow in a rotation gives good results, species of *Acacia*, *Maerua* and *Bauhinia* being recommended for this.—E.B.

1078 Leloux, P. Note au sujet de la conservation des sols. [**Note on soil conservation.**] *Bull. agric. Congo belge* 1949, **40**, 1745-8. [Exp. Sta. Kisozi (Urundi, Belgian Congo)]

An account is given of research carried out at the Kisozi station situated at an altitude of 2175 m. on hilly land. Several species (trees and herbaceous plants) were tested for soil building. *Pennisetum benthami* is unsuitable for very poor soils; on other soils, after a year and a half, it forms a good cover and it is also suitable for soil conservation. Experimental cultivation with *Zea mays* and *Eleusine* was carried out on the improved soil. *Crotalaria agathiflora* was grown successfully on the yearly fallow. Results of erosion control are considered good.—E.B.

1079 Jaumain, M. M. H. La conservation des sols et la rentabilité des cultures indigènes en territoire de Lubero et zone Bashu-Beni. [**Soil conservation and returns from native crops in the territory of Lubero and the Bashu-Beni zone (Belgian Congo).**] *Bull. agric. Congo belge* 1949, **40**, 1416-54.

Information on the agriculture of this region (situated over 2000 m. above sea level) and advice for its improvement are given. The natural soil fertility has been exploited by intensive cropping with wheat, maize, potatoes, beans, peas, sweet potatoes, and taro. For erosion control about 16,000 km. of contour rows of *Pennisetum* are already established. For protection against fire, hedges of *Erythrina* are advised. On poor soils cultivation of *Fagopyrum esculentum* should be extended. During fallow the soil can be protected by sowing a legume such as white clover, fenugreek, and vetch. Examples of rotations are given.—E.B.

1080 Bulletin Agricole du Congo Belge La raquette inerme dans la lutte contre l'érosion éolienne. [***Opuntia ficus indica* for wind erosion control.**] *Bull. agric. Congo belge* 1949, **40**, 1415 [Serv. Elevage, Madagascar]

The prickly pear, *Opuntia dillenii*, was in the past abundant in semi-desert regions of South Madagascar where it provided food for men and animals in the dry season and was a protection to crops against wind. It was destroyed by the mealy bug *Dactylopius tomentosus*. *O. ficus indica*, resistant to this parasite, is now under trial at Ambowombe for forage and as a wind break. *Opuntia* is planted along twin rows 10 to 15 m. apart ; maize and manioc being grown between these rows.—E.B.

1081 DEIGHTON, F. C. **Agriculture and forestry in relation to soil and water conservation in Sierra Leone.** [Excerpt from] " Management and Conservation of Vegetation in Africa," Herbage Bull. No. 41, *Bull. agric. Congo belge* 1949, **40**, 1293-8.

1082 CIOLINA, F. L'hydraulique agricole et la conservation des sols. [**Irrigation and soil conservation.**] *Bull. agric. Congo belge* 1949, **40**, 1697-9. [Serv. Agric., Madagascar]

In Madagascar, rice is the basic food of the natives. The crop is irrigated and, in some regions, produces two harvests per year. About half of the cultivated area (580,000 ha.) is under rice ; and 90,000 ha. are irrigated. Irrigation works have been extended in the last 40 years. An extensive method of cultivation is therefore being replaced by a semi-intensive method.—E.B.

1083 AXLEY, J. H., and THOMAS, R. P. **Soil moisture variations as influenced by vegetation.** *Proc. Soil Sci. Soc. Amer.* 1948, **13**, 548-50, bibl. 12. [Univ. Maryland College Park, Md]

Moisture levels in forest soils over a period of 6 years were maintained at higher levels than in those soils under maize, hay, grain and pasture. Grain and hay made higher demands on the moisture content of the soil than young maize, but the uptake by maize was greater than grain or hay in July and August. Following the early depletion of moisture in May and June, pasture vegetation produced relatively low moisture conditions in the summer and autumn, while soil under bluegrass pasture was found to be drier than under a leguminous hay crop. The amount of moisture lost through evaporation indicates that pasture yields would be greater from their moisture content aspect if they were not too closely grazed. This may explain the excellent growth of grasses noted in pasture rotation where grasses are never pastured too closely. The increase in yields where pasture furrows were used to reduce the run-off of water further substantiates the theory regarding the importance of a protective cover in controlling evaporation, and, in consequence, the moisture content of the soil.—A.D.H.

1084 UNITED STATES, Department of Agriculture. Misc. Pub. No. 694. **Conservation methods in cotton production.** By *H. Hendrickson*. 1949, pp. 32, bibl. 9. [Soil Conservation Service, Watkinsville, Ga.]

The bulletin reviews various aspects of the soil erosion problem in the U.S. Cotton Belt. The results of research into conservation on four experimental stations are reported and the practical application of various soil conservation practices, such as strip cropping and crop rotations, are discussed.—P.J.B.

1085 WHITEHEAD, C. E. **Soil conservation project in Nadroga-Navosa.** *Agric. J. Fiji* 1949, **20**, 9-13, illus.

A report on the construction and subsequent effectiveness of a system of cotton cultivation and strip cropping.—N.G.S.

CROPS IN GENERAL

Agronomy

1086 BELL, G. D. H. **Plant breeding and crop production.** *Farming* 1950, **4**, 101-4. [Plant Breed Inst., Cambridge]

A reasoned account of plant breeding ; its relationship to farming and other sciences and its part in present-day affairs.—From author's abstract.

1087 BELL, G. D. H. **The Plant Breeding Institute** [**Cambridge**]. *Farming* 1950, **4**, 205-9.

An illustrated account of some of the work being done at the Plant Breeding Institute, Cambridge, where the scope of work is being enlarged to deal more adequately with those crops already handled and to incorporate other crops, such as field brassicas, etc.—E.B.H.

1088 WINKLER, H. Frostskyddsundersökningar. [**Investigations into protection against frost.**] *Försök och Forskning* 1950, **7**, No. 6, 45.

At Flahult Experimental Station in Jönkoping province, Sweden, frost protection experiments have been in progress since 1946 in which artificial mist is being tested as a means for protecting potato crops. Hitherto the so-called "mist acid," used by the Navy, has been employed, with some success. It is intended to test other preparations and appliances and to investigate frost protection methods elaborated in other countries, particularly in Finland.—R.P.J.

1089 AYERS, A. D., and HAYWARD, H. E. **A method for measuring the effects of soil salinity on seed germination with observations on several crop plants.** *Proc. Soil. Sci. Soc. Amer.* 1948, **13**, 224-6. [U.S. Dept Agric., Riverside, Calif.]

Although alfalfa and sugar beet are salt-tolerant crops, experiment showed that they are relatively sensitive to salinity during germination. Of the species tested, barley seeds germinated at the highest level of salinity. Maize was less tolerant of salinity during the later stages of growth than were beet or alfalfa, though maize would germinate at a higher level of salinity. Dwarf kidney beans were as sensitive to salinity during germination as during growth. Results emphasize the absence of any general relation between salt tolerance of a plant during the later phases of growth and that during germination. More information is needed regarding the relative salt tolerance of the germinating seed of various crops, and this article suggests a precise method of obtaining it.—A.D.H.

1090 UNITED STATES, Department of Agriculture. Tech. Bull. No. 1007. **Crop rotation and tillage experiments at the North Platte (Nebr.) Substation 1907-34.** By *L. L. Zook* and *H. E. Weakly*, 1950, pp. 78.

Figures are given of the average yields, over the period reviewed, of winter and spring wheat, oats, barley, winter rye, maize, milo and sorgo grown under a number of rotational and tillage systems. Weed populations in maize were far lower in fields where tillage preparations for seeding had followed the harvest promptly, than they were in fields where tillage preparations were delayed until seed time. In comparisons of 3-year rotations of fallow/wheat/wheat and maize/wheat/wheat, 12-year average yields of the second winter wheat crop were 14.4 and 11.4 bu. per acre, respectively. In 2-year rotations the 12-year average yields of winter wheat were 9.7 bu. per acre from wheat seeded in standing stubble and 16.7 bu. per acre where stalks were removed and stubbles disced before seeding, a fact thought to be mainly due to soil moisture losses caused by standing stubble. Winter wheat failures on summer fallowed land were less than 10 % ; this is lower than that for any other rotational system. Winter wheat yields for the first year following rye and peas grown and ploughed under for green manure were lower than the yields following clean fallow. When moisture deficiencies caused by growing the green manure crop were eliminated by intervening crops, the yields of wheat grown as a third crop after green manuring were slightly higher than for the third crop following bare fallow, with the same intervening crops. On adjacent plots, one prepared by continuous clean fallow and the other by growing and ploughing under rye as green manure each year, there was no difference in the 10-year average yields of winter wheat from the two plots, but the straw yield was 44 per cent higher on the green manured plot than on the fallowed plot. The 12-year average yield of barley after fallow was 31.1 bu. per acre, exceeding the yield after maize by 13.2 bu. per acre. Each bushel of barley gained by fallow was offset by 1.5 bu. per acre of maize that could have been grown, but total failure of barley following fallow occurred once for every three failures following maize. Maize gave the poorest response to fallowing of all the crops tested. 28-year average yields of maize following fallow were only 3 bu. per acre higher than for continuously cropped maize.—P.J.B.

1091 IOWA Agricultural Experiment Station. Res. Bull. 371. **Plant research in the tropics.** Edited by *I. E. Melhus*. 1949, pp. 500-660.

This bulletin constitutes the first published report of research carried out at the Iowa State College Research Centre at Antigua, Guatemala. The centre was started in 1945 for research and graduate study in agriculture and the natural sciences. The main object of the centre is the pursuance of laboratory and field studies in the place of origin of crop plants, including maize, beans and upland cotton. The bulletin contains a symposium on the growth and development of maize in the Latin American countries. Contributions from research work include observations of a hitherto unrecorded serious insect pest of maize, the larval stage of the fly *Euxesta major*. The fly deposits its eggs on the seedlings near ground-level, and the larva, on hatching, makes its way via the leaf whorl into the growing-point, which it destroys. Trials with BHC-50 and gammexane showed that maggot injury could be considerably reduced, but more work is needed to evolve the practical details of control measures.—P.J.B.

1092 UNITED STATES, Department of Agriculture, Bureau of Agricultural and Industrial Chemistry. AIC-61. **Survey of the chemical composition of cotton fibres, cottonseed, peanuts and sweet potatoes—a literature review.** By *J. D. Guthrie* and others. 1949, pp. 116. [Mimeographed]

1093 WILSHAW, R. G. H. **Agronomic and breeding research on rice, oil-palms, and cacao in Malaya. Part I. Rice.** *Emp. J. exp. Agric.* 1950, **18**, 227-32. [Dep. Agric. Fed. Malaya]

A brief review of the present position of investigations carried out by the Department of Agriculture, with an indication of the lines of future advance. Special reference is made to agronomic investigations and to selection and breeding work undertaken in the past 20 years.—E.B.H.

1094 BONJOUR, A. A. Siembras combinadas de trigo y lino. [**Combined sowing of wheat and flax.**] *Memoria de la segunda reunion de lino* 1949, 86. ["La Estanzuela" Uruguay]

Varieties

1095 CAMBRIDGE, National Institute of Agricultural Botany. **Better seeds: better crops. Key to varieties of field and vegetable crops under trial, observation and propagataion, 1950**. 1950, pp. 50.

1096 WEXELSEN, H. Polyploidiforedling en oversikt. [**Breeding of polyploids. A review.**] *Forsk. forsøk landbr.* 1950, **1**, 287-310, bibl. 77. [English summary, p. 307].
An account is given of progress in breeding polyploid *Brassica campestris*, *Beta vulgaris* and allopolyploid forms of *Triticum vulgare* × *Secale cereale* crosses. See *Plant Breeding Abstracts*.—P.J.B.

1097 RAMANATHAN, K. **Addendum to list of chromosome numbers in economic plants.** *Curr. Sci.* 1950, **19**, 155, bibl. 1. [Cytogenetics Lab., Agric. Res. Inst., Coimbatore]

1098 FRANKEL, O. H. **The development and maintenance of superior genetic stocks.** *Heredity* 1950, **4**, 89-102, bibl. 36. [Wheat Res. Inst., Christchurch, N.Z.]

1099 PATTERSON, R. E. **A method of adjustment for calculating comparable yields in variety tests.** *Agron. J.* 1950, **42**, 509-11, bibl 3. [Texas Agric. Expt Sta.]
The method described utilizes the principles of analysis of variance. It has advantages in ease of calculation. The objectionable feature of the distortion of variety/year interaction, inherent in the usual methods of calculation of comparable yields, is avoided so that it is possible to obtain an accurate estimation of varietal variation.—P.J.B.

1100 NORTH CAROLINA Agricultural Experiment Station. Bull. No. 368. **Measured crop performance 1949.** By *H. L. Cooke* and *R. P. Moore.* 1950, pp. 41.
The bulletin presents summarized data of performance tests on hybrid maize, cotton, wheat, oats and barley varieties and gives recommendations for their regional adaptation in North Carolina.—P.J.B.

Seeds

1101 HORNE, F. R. **The production of pure seed stocks of improved varieties.** *J. R. agric. Soc.* 1949, **110**, 38-50, bibl. 8. [N.I.A.B., Cambridge]

1102 ÉIRE, Department of Agriculture. **Report of the Seed Propagation Division, 1948**. *J. Dep. Agric. Éire* 1949, **46**, 149-66.

1103 OLSSON, A. Inverkan av utsädets ålder och mognadsgrad på skördeutbyte och kvalitet hos vissa lantbruksväxter. [**Effect of age and degree of maturity of seed of certain agricultural crops on the amount and the quality of the harvest.**] *K. LantbrAkad. Tidskr.* 1950, **89**, 241-61, bibl. 3. [English summary, p. 261].
Results of trials conducted in Sweden with pea seed of varying age are reported. In peas harvested before full maturity and stored for 3 to 4 years an after-ripening takes place which decreases the retardation in development which normally results from sowing immature seed. Under similar conditions mature seed gives a higher seed yield than immature seed, but the haulm yield of the latter is generally greater than that from mature seed. Further experimentation is necessary. Corresponding trials have been initiated with barley and oats.—R.P.J.

1104 NURET, H., and DUBOIS, M. Note sur le dosage rapide de l'eau dans les grains. [**A note on the rapid determination of moisture in grain.**] *C. R. Acad. Agric. Fr.* 1949, **35**, 477-80.
A rapid method (best for accuracy) and an electric method (best for simplicity and speed) for determining moisture in wheat are described.—K.O.

1105 SUMANOV, E. Ja. [**Seed qualities of grain susceptible to frost.**] [Russian] *Selek. Semenovod.* 1949, **16**, No. 12, 57-61. [Kurgan Agric. Inst., Dept of Crop Husbandry]
Wheat sown on fallow showed delayed ripening in years characterized by an increased number of rainy periods and low temperatures during the plant's vegetative period. Grain harvested in the stage of wax ripeness was larger and less seriously injured by frost. Plants from seed susceptible to frost were delayed in development and gave small yields. The grains of the upper part of the ear suffered least from frost and those of the lower part suffered most. In the evaluation of seed susceptible to frost, it is necessary to determine not only germination but also vigour of initial growth. In wheat grains susceptible to frost the pericarp and testa readily become loose from the endosperm. On germination, in many grains the embryo does not penetrate the sheath at the scutellum (as is usual in sound grains) but extends under the sheath and penetrates it near the small tuft. In barley susceptibility to frost is indicated by the following characteristics: the outer sheaths become loose from the endosperm and are removed fairly easily; the pericarps become much darkened.—R.P.J.

1106 SUMANOV, E. Ja. [**Secondary period of dormancy in seed.**] [Russian] *Selek. Semenovod.* 1950, **17**, No. 4, 66-8. [Kurgan Agric. Inst.]

During storage at low temperatures damp seeds of grain crops may enter a secondary period of dormancy and on this account cause reduced germination. In germination tests of such seeds damp sand at 60 per cent of its full moisture capacity should be used. Seeds in the secondary period of dormancy can be made to germinate by protracted atmospheric heat treatment.—R.P.J.

1107 HOOVER, M. M. **New crop projects in N. Central U.S.A.** *World Crops* 1950, **2**, 298-9. [North Central Plant Introduction Station, Ames, Iowa]

A description is given of the work of the newly-established Station at Ames which forms part of the Primary Plant Introduction service set up by the United States Department of Agriculture to provide the necessary facilities and control for further introduction of commercial seed to the U.S.A. from abroad.—E.B.H.

1108 BERG, M. Bestämning av vattenhalt hos spannmål och frö. [**Determination of moisture content in grain and seed.**] *Lantm. Svenskt Land* 1950, **34**, 557-8. [Swedish Institute of Agricultural Engineering, Uppsala, Sweden]

1109 LAMBERT, D. W., WORZELLA, W. W., KINCH, R. C., and CHEADLE, J. N. **Devitalization of cereal and weed seeds by high frequency.** *Agron. J.* 1950, **42**, 304-6, bibl. 3. [S. Dakota Agric. Expt Sta., Brookings]

Studies are reported on the devitalization of the seeds of three species of cereal and seven weed species by radio frequency fields. At voltages high enough to devitalize the weed seeds, the cereal seeds were either devitalized or their germination percentages seriously reduced. Heating appeared to be the cause of death.—P.J.B.

1110 MCCALLAN, S. E. A. **Some chromate complexes and organic compounds as seed protectants.** *Contr. Boyce Thompson Inst.* 1950, **16**, 5-20, bibl. 8.

Of a series of 640 chromate and organic compounds tested, the following three proved promising seed protectants and had no unusual toxic effects on animals in preliminary skin tests : (a) the reaction product of dimethyldithiocarbamate and sulphur dichloride, and the two chromate complexes (b) $HgO.\ ZnO.\ CrO_3$ and (c) $CuO.\ ZnO.\ CrO_3.\ H_2O$. These compounds were compared in trials under field conditions with standard protectants on peas, lima beans, maize and other horticultural crops, and greenhouse tests were carried out on sorghum ; (b) proved outstanding on maize and gave good results on peas and sorghum, but was injurious to lima beans ; (c) proved best on peas and gave fair results on all the other crops tested except lima beans, to which it was probably injurious ; (a) proved best on lima beans and maize and was the most generally effective of all the compounds tested. Seven tables of data are given in the text.—P.J.B.

1111 HOCKING, B. **On the effect of crude benzene hexachloride on cereal seedlings.** *Sci. Agric.* 1950, **30**, 183-93, bibl. 20. [Dept of Entomology, Alberta Univ.]

Following reports of the unfortunate effects of benzene hexachloride (BHC) on the development of plants both from the seed and the tuber, investigations were carried out to determine the effect of various preparations and constituents of crude BHC on the germination of cereal seedlings. Experiments showed that the gamma isomer of BHC was not responsible for seedling deformation, but that mixtures of trichlorobenzene prepared by the breakdown of alpha BHC were far more active, producing complete inhibition of germination even when present in relatively small amounts. The most active materials in the trichlorobenzene mixtures were 1,2,4, trichlorobenzene, followed by the 1,2,3, and lastly by the 1,3,5, isomer. The possibility of utilizing these materials as selective herbicides is now under investigation. BHC preparations for treating cereal seed against wireworm should be of high gamma isomer content and applied at the minimum rate consistent with the control of wireworm. The hazards accompanying the use of BHC preparations are likely to be increased by the storage of seed after treatment, especially if ventilation is inadequate, by exposure to sunlight, and by deficient soil moisture and high soil pH.—P.J.B.

Maintenance of fertility

1112 CULPIN, S. **Straw and soil fertility.** *Farming* 1950, **4**, 109-12.

1113 RUSSELL, E. J. **Changing fertiliser practice.** *Farming* 1950, **4**, 229-32.

A review of the progress in the employment of fertilizers in agriculture from the first marketing of J. B. Lawe's patent manures to the present day.—From author's summary.

1114 STEWART, A. B. **Fertilizers and lime in Scotland. I. Fertilizers and crop production.** *Scot. J. Agric.* 1950, **30**, 107-11, bibl. 7. [Macaulay Inst. Soil Res., Aberdeen]

A brief review of the principal scientific and technical factors affecting the use of fertilizers.—E.B.H.

1115 Løvø, P. J. Langvarige gjødslingsforsøk. [**Long duration manurial experiments (in Norway).**] *Forsk. Forsøk Landbr.* 1950, **1**, 239-85, bibl. 11. [English summary, p. 282-5].

Results are reported of two long-duration manurial experiments conducted at the State Agricultural Experiment Farm, Voll (near Trondheim) with a crop rotation of: 1st year oats; 2nd year potatoes or root crops; 3rd year barley with ley seeding; 4th to 7th year, ley.—R.P.J.

1116 Nilsson, E. Något om relationerna mellan växten och markens mikroflora. [**Interrelationship between crop and soil microflora.**] *K. Lantbr. Akad. Tidskr.* 1950, **89**, 262-73, bibl. 4, [English summary, p. 272].

A paper read at the annual meeting of the Swedish Society of Soil Science, November 22, 1949.—R.P.J.

1117 Sørensen, C. Kvælstoftilførslens Indflydelse paa Afgrødernes Proteinudbytte. [**Effect of nitrogen supply on the protein yield of crops.**] *Ugeskr. Landm.* 1950, **95**, 335-8, 351-5. [Danish Coll. Agric.]

Trials with cereal crops conducted in Denmark and Sweden are reviewed. The results indicate that the protein yield rises the nearer to the shooting stage of the crop the application of N takes place, that a large increase in yield may be expected following the application of comparatively liberal amounts of nitrogenous manure at this time, and that the increase in straw length, and so the risk of lodging, is less with late application of N manure. In Danish trials with mangolds and swedes, the content of amide-N rose uniformly and in a greater degree than the content of pure protein-N, but the most marked increase occurred in the content of nitrate-N, which rose from 0.190 to 0.391 and from 0.024 to 0.041 in mangolds and swedes respectively when 0 and 90 kg. N had been applied per ha.—R.P.J.

1118 Barbos, I. Alguns aspectos do problema das fertilações organicas dos solos planálticos. [**Some aspects of the problem of organic fertilizers on plateaux soils.**] *Agron. Angolana* 1949, **2**, 45-57, [English summary].

The plateaux soils in the South of Angola lack organic matter. A comparison was made between green manuring, dunging, and artificial manuring. The crops used for green manure were *Lupinus angustifolius*, *Vigna unguiculata*, *Crotalaria juncea* and *Glycine hispida*. It is concluded that green manuring should be practised only where it is difficult to obtain the necessary quantity of animal manure for the cultivated area.—N.G.S.

1119 Marais, J. S. **Farming in the winter-rainfall area [of Cape Province.]** *Fmg S. Afr.* 1949, **24**, 589-93, 599.

Due to the favourable wheat season in 1948, differences in yield between various long-term experimental treatments were considerably smaller than normal. Since nitrogen losses were apparently negligible, treatments which supplied larger quantities of available nitrogen gave less noticeable increases in yield. A crop rotation incorporating lupins as the soil improvement crop was started at Mariendal. It is necessary to find non-shattering lupins, without a hard testa, palatable to cattle. So far varieties combining these qualities are lacking. Sweet lupins lacked the vigour of the bitter types. Experiments were carried out at Langgewens on the establishment of lucerne and on the eradication of Ramenas and various wild peas using 2,4-D, Methoxone, and Denocate. The influence of herbicides on winter cereals was also investigated. The two wheat varieties Hoopvol and Impala, and the oat varieties Jongensklip and Langgewens gave the best yields at both Langgewens and Elsenburg. Disinfection of cereal seed against take-all produced no results.—N.G.S.

1120 Greenwood, M. **The peasant use of fertilizers in Northern Nigeria.** *E. Afr. agric. J.* 1950, **16**, 34-9, bibl. 2. [Dept Agric., Zaria, Nigeria]

1121 Foscolo, E. Cultures, jachères et engrais verts. [**Cultivation, fallow and green manure.**] *Bull. agric. Congo belge* 1949, **40**, 1733-4. [Industr. agric., Gembloux]

Rainfall distribution in the Belgian Congo allows two crops per year, the harvests taking place in July/August and January/February. One year's cultivation is followed by a 6-months' fallow. The volunteer plant growth on the fallow can be ploughed in, but larger quantities of green manure are obtained by growing *Mucuna*, *Sorghum*, *Helianthus annuus*, *Crotalaria* spp., *Canavalia ensiformis*, *Centrosema plumieri*, *Zea mays* and other plants. *Mucuna* is reported to give the best results.—E.B.

1122 Laubscher, F. X. **Crop production in relation to soil conservation.** *Bull. agric. Congo belge* 1949, **40**, 1475-86, bibl. 20. [South Africa, Dept Agric.]

The possibility of introducing ley crops (particularly grasses) into a rotation with annuals to maintain soil fertility in tropical and sub-tropical countries is examined. The role of crop residues is particularly stressed. The problem of suitable species is still to be solved and work on selection is required. Some grasses which have been employed for this purpose are indicated. Information is given on the crop regions and the climates of the Union of South Africa.—E.B.

1123 Senegal, Service de l'Agriculture. Mémoire concernant les mesures prises ou à prendre pour conserver aux terres à arachide leur potentiel de fertilité. [**Note on the measures adopted, or to be adopted, to maintain the potential fertility of soils under groundnuts.**] *Bull. agric. Congo belge*, 1949, **40**, 1557-61.

Information on soils, erosion, climate, and cultural methods of Senegal is given. The 4-years' rotation practised in some regions, which includes groundnuts and millet, is followed by a period of fallow. For wind control screens of trees, particularly *Faidherbia albida*, are recommended. A crop for green manure should be included in the rotation. The following rotation is being studied: millet intercropped with cow-peas and groundnuts, followed by a fallow with a crop for green manure. Cow-peas are sown in the millet at the end of August or beginning of September and remain in the soil until January. After the grain harvest the millet stems are left on the soil.—E.B.

1124 Gonzalves, Ella A. **The place of algology in agriculture, industries and fisheries.** *Indian Fmg* 1950, **11**, 20-3.

1125 Gosdin, G. W., Stelly, M., and Adams, W. E. **The organic matter and nitrogen content and carbon-nitrogen ratio of Cecil soil as influenced by different cropping systems on classes 2, 3 and 4 land.** *Proc. Soil Sci. Soc. Amer.* 1949, **14**, 203-8, bibl. 8.

1126 Mehlich, A., and Reed, J. F. **Characterization of the plant factor in the cation requirement and contents of plants.** *Proc. Soil Sci. Soc. Amer.* 1948, **13**, 399-401, bibl. 7. [North Carolina Agric. Exp. Sta., Raleigh]

The total and proportionate cation content of six species of plants (turnips, cotton, soybeans, cowpeas, oats and wheat) were used as a basis to compute a series of co-efficients which can serve as an index to the Ca requirements of different plant species. It was shown that cotton required a very much higher degree of Ca saturation than soybeans for optimum growth.—A.D.H.

1127 Goring, C. A. I., and Clark, F. E. **Influence of crop growth on mineralization of nitrogen in the soil.** *Proc. Soil Sci. Soc. Amer.* 1948, **13**, 261-6, bibl. 24. [Iowa Agric. Exp. Sta., Ames]

1128 Page, N. R., and Paden, W. R. **Differential response of snapbeans, crimson clover, and turnips to varying rates of calcium and sodium borate on three soil types.** *Proc. Soil Sci. Soc. Amer.* 1949, **14**, 253-7, [South Carolina Agric. Expt Sta., Clemson, S.C.]

On Marlboro' and Cecil sandy loam, 10 lb. per acre of Colemanite ($Ca_2B_6O_{11}.\ 5H_2O$) were required to increase the boron content of turnip (*Brassica campestris*) leaves, whilst 40 lb. per acre were required on Nosbig fine sandy loam. All rates above 5 lb. per acre of Rasorite ($Na_2B_4O_7.\ 4H_2O$) on all the soils increased the boron content of the leaves. Neither source of boron at rates up to 40 lb. per acre of Rasorite and 80 lb. per acre of Colemanite reduced the yield of turnips, unlike the case of the other two crops studied.—P.J.B.

1129 Cooper, H. P., Mitchell, J. H., Page, N. R., and Garman, W. H. **The differential in the chemical composition of reproductive and vegetative plant tissues as influenced by the relative energy properties of the available nutrients.** *Proc. Soil. Sci. Soc. Amer.* 1948, **13**, 323-34, bibl. 33. [South Carolina Agric. Exp. Sta., Clemson (H.P.C., J.H.M., and N.R.P.) and Univ. Arkansas (W.H.G.)]

1130 Reuszer, H. W. **A method for determining the carbon dioxide production of sterile and nonsterile root systems.** *Proc. Soil Sci. Soc. Amer.* 1949, **14**, 175-9, bibl. 9.

1131 Lillard, J. H., Moody, J. E., and Edminster, T. W. **Application of the double-cut plow principle to mulch tillage.** *Agric. Engng, St. Joseph, Mich.* 1950, **31**, 395-7, bibl. 5 [Virginia Agric. Expt Sta., Blacksburg]

The report reviews progress on problems involved in utilizing crop residues for mulches in Virginia. It has been shown that in rotations including one or more perennial grass and legume crop, subsurface tillage with sweeps, rippers, etc., is quite unsuitable; when such practices are followed by discings the resultant vegetation growth is so rapid that the planted crop suffers. The double-cut plough was adopted as a means of avoiding this disadvantage. Further research into improved methods of crop planting and seed-bed preparation after double-cut ploughing is needed.—P.J.B.

Weeds

1132 World Crops. **The problems of selective weed-killing.** *World Crops* 1950, **2**, 252-4.

A synopsis of the inaugural Fernhust lecture recently given at the Royal Society of Arts by Professor G. E. Blackman of Oxford University.—E.B.H.

1133 Thurston, Joan M. **The wild oat problem.** *Farming* 1950, **4**, 332-4, 341. [Rothamsted Expt Sta.]

Research is in progress at Rothamsted and elsewhere to determine an effective method for controlling *Avena fatua*, *A. strigosa* and *A. ludoviciana*, which, because of the persistence of their seeds in the soil for several years, must depend on breaking their dormancy. Cultivation methods designed to help farmers to keep their land free of infestation and to clean already infested land, are outlined.—E.B.H.

1134 von Hofsten, C. G. Vildhavren ar ett växtföljdsproblem. [**The wild oat is a crop rotation problem.**] *Lantmannen* 1950, **34**, 347-9, 407-9.

In Sweden, *Avena fatua* is one of the worst weeds. It is also an increasing problem in many parts of the world where grain is cultivated. What is needed is a method for preventing it seeding. IPC (isopropylphenylcarbamate) in various preparations will kill the germinating seeds of wild oats, but its use is unsatisfactory in many respects. The rotation of crops is of decisive importance. Such crops as autumn cereals, autumn rape and early-harvested green fodder, in which seed production of wild oat is made impossible, should be cultivated. The cultivation of cereals for seed should be discontinued in wild oat districts.—R.P.J.

1135 Försök och Forskning Utrotning av flerårigt rotogräs genom potatisodloing. [**Eradication of perennial weeds by the cultivation of potatoes.**] *Försök Forskn.* 1950, **7**, No. 7, 55.

The results of an experiment conducted at the Agricultural Research Institute, Dickursby, Finland, are reported. In the spring of 1947, the weight of rhizomes of couch grass (*Agropyron triticum*) per sq. metre of the experimental area, was 600 grm. Potatoes were grown on the area and after the crop was lifted at the beginning of October the weight of couch grass rhizomes per sq. metre was 49 grm. only. After harvesting a second potato crop in the autumn of 1948, not a single rhizome of couch grass could be found in the field.—R.P.J.

1136 Vidme, T. Hormonpreparater og nitropreparater i kampen mot ugraset. [**Hormone preparations and nitro-preparations in the control of weeds.**] *Norsk Landbr.* 1950, **16**, 199-204.

Results of experiments with grain crops and pastures conducted in Norway from 1947 to 1949 are reported.—R.P.J.

1137 Scaramuzzi, F. Ricerche sulla flora infestante delle colture in Italia. 3. La flora infestante di alcune colture presso Bari. [**Researches on noxious flora of crops in Italy. 3. Noxious plants in some crops near Bari.**] *Nuovo G. bot. ital.* 1949, **56**, 58-105, bibl. 27, [English summary, p. 103-4]. [Ist. bot. Univ. Bari]

After giving information on the climate and soil of the region, the principal weeds of cultivated areas are described. The weeds growing along roads and paths are also included, because every year, generally for a short period only, they invade the fields. Of the 162 species studied, 79 per cent are therophytes. The biological cycle and geographical distribution of the thirty-eight most noxious weeds are examined more particularly. A statistical study was carried out in plots of various non-irrigated crops, including wheat, lucerne, peas and beans. The results are summarized in diagrams which show the frequency of the various weeds in respect of the crop, biological phases, type of root system and influence of cultivation and weeding.—E.B.

1138 Gazeta do Agricultor. Um novo mondador químico " Fernoxone." [**A new world chemical " Fernoxone "** *Gaz. Agric. Mozambique* 1950, **11**, 168-9.

Fernoxone is largely based upon 2,4-D. It is said to be neither poisonous, corrosive, nor inflammable. The following are some recommended doses : 1.5 lb. per acre for *Brassica sinapis* ; 1.3 to 2 lb. per acre for *Raphanus raphanistrum* ; 2 lb. per acre for *Vicia atropurpurea* and *V. sativa*. For *Chenopodium* spp., *Papaver rhoeas*, *Cirsium* spp., *Xanthium* spp., and *Erigeron canadense* 2 to 2.5 lb. per acre. In the case of the last three, good results, but not complete control, were obtained. Application in solution at the rate of 2 lb. per acre will prevent flowering and seeding in *Hypochaeris radicata*, *Polycarpon tetraphyllum*, *Fumaria muralis*, *Erodium moschatum*, *Anagallis arvensis*, and *Sonchus oleraceus*, and certain other plants. Sedges can be controlled by the application of 5 to 6 lb. Fernoxone per acre, two applications being needed if there is a heavy infestation. Fernoxone persists for 2 to 3 months. Warning is given that cotton, tomatoes, French beans, lucerne and flax are very susceptible to Fernoxone, and that reasonable care in handling it should be taken. [The substance of this article originally appeared in *Veld*, Spring 1949]—N.G.S.

1139 Moore, R. M. **Differential effects of certain phenoxyacetic acid compounds and phenylcarbamates on plant species. 1. Effect of applications to the soil prior to emergence.** *Aust. J. agric. Res.* 1950, **1**, 52-63, bibl. 6, fig. 9.

Investigations were conducted in glass-house and field. The effects of both types of compounds on the establishment of all monocotyledons and dicotyledons tested and on the ear formation and grain yield of a cereal *Triticum vulgare*, are described. The phenoxyacetates, applied in 0.1 per cent concentrations, markedly inhibited all the dicotyledonous species. Monocotyledons were, in general, more tolerant than the dicotyledons but were affected at the higher concentrations. The phenylcarbamates produced toxic responses, in varying degree of intensity, on all the graminaceous species tested but affected only one dicotyledon, viz, *Linum usitatissimum*. Symptoms of toxicity are described and some factors which appeared to govern their intensity are noted.—From author's summary.

1140 DOWN TO EARTH. **Pre-harvest spraying of seed crops.** *Down to Earth* 1950, **6**, 2-3.

The technique of pre-harvest aerial spraying of weed-infested flax and alfalfa seed crops is outlined. In flax, the crop is sprayed with 2 pints of Dow General weed-killer in 10 to 15 gal. of diesel oil at the stage when the crop would normally be windrowed. 3 to 6 days later, when the green weeds are mostly dead and dry, the crop is harvested by direct combining. In a trial of flax which had been pre-harvest sprayed and direct combined, the yield was 35.9 bu. per acre; unsprayed windrowed flax yielded 27.5 bu. per acre and the seed was much less clean than that from the sprayed crop.—P.J.B.

1141 ANDERSON, G. R., and BAKER, G. O. **Some effects of 2,4-D in representative Idaho soils.** *Agron. J.* 1950, **42**, 456-8, bibl. 16. [Idaho Agric. Exp. Sta. Moscow, Idaho]

It was shown that beans, peas, red clover, and alfalfa are quite sensitive to low concentrations of 2,4-D in the soil. The usual field applications of 1.3 lb. per lb. of 2,4-D salts do not interfere with the planting of leguminous crops the following year. Slight residual action was noted only in soils stored in the greenhouse under cold-wet conditions after an application of 6 lb. to the acre. It was noted that bean seed showed a decrease of protein content in the second crop when grown on soil which had been treated with 2,4-D at 6 lb. to the acre. It was indicated that 2,4-D salts exerted only a transitory inhibition of the growth of micro-organisms.—N.G.S.

1142 MICHIGAN Agricultural Experiment Station. Circ. Bull. 214. **Chemical weed control.** By *B. H. Grigsby, B. R. Churchill, C. L. Hamner* and *R. F. Carlson*. 1949, pp. 36.

1143 WEINTRAUB, R. L., BROWN, J. W., and YEATMAN, J. N. **Recovery of growth regulator from plants treated with 2,4-dichlorophenoxyacetic acid.** *Science* **111**, 1950, 493-4, bibl. 5.

Following the application of 2,4-dichlorophenoxyacetic acid to the primary leaf system of a *Phaseolus vulgaris* seedling, extracts from other parts of the plant were found to contain material with a considerable proportion of the growth-regulating activity of 2,4-D. From evidence given in the text, it is concluded that the extracts contain 2,4-D itself, or some dissociable salt thereof.—P.J.B.

1144 ERICKSON, L. C., and GAULT, H. S. **The duration and effect of 2,4-D toxicity to crops grown on calcareous soil under controlled irrigation conditions.** *Agron. J.* 1950, **42**, 226-9, bibl. 5. [Idaho Agric. Expt Sta., Moscow]

Trials were carried out to determine the toxicity and rate of decomposition of 2,4-D under conditions of low soil moisture and under irrigation. Five different crops were planted at intervals of 15, 30 and 40 days following soil applications of 2,4-D at two rates, i.e. 2 and 4 lb. of acid equivalent per acre. Soil toxicity was not reduced over a 45 day period during which 0.18 in. of rain fell, but it declined rapidly after irrigating the plots. Alfalfa was the most sensitive crop to 2,4-D, followed by beans, oats, maize and potatoes in that order. In no cases was the ground irrigated until the crops were planted. In the mature crops, beans, with an average reduction in stand of 68 per cent, were reduced only 9 per cent in seed yield. Oats had a greater percentage stand than beans, but lodged almost completely as a result of their weakened root systems. The toxicity of 2,4-D to germinating weed seedlings began to dissipate 15 days after the first irrigation and in 30 days the soil appeared to be free of 2,4-D. There was no significant difference between the effects of the 4 lb. and the 2 lb. rate of application of 2,4-D.—P.J.B.

1145 BOHMONT, D. W. **Herbicidal properties of shale oil fractions.** *Agron. J.* 1950, **42**, 179-82, bibl. 4. [Wyoming Agric. Expt Sta., Laramic, Wyo.]

The herbicidal properties of the kerosene, naphtha and gas oil fractions of shale oil were tested on bean plants. Tabulated data illustrate the varying degrees of phytotoxicity of the different concentrations of the various fractions tested.—P.J.B.

1146 WOODFORD, E. K. **Experimental techniques for the evaluation of selective herbicides.** *N.A.A.S. Quart. Rev.* 1950, No. 9, 1-10. [Agric. Res. Council, Univ. Oxford]

The evaluation of toxicity has three stages; the determination of the degree of toxicity of the herbicide to the crop, to the weed, and to the crop and weed in association. The final stage may involve changes in the ecological balance. A technique for field trials, using a randomized plot layout, is described. The size of the plot varies with the problem. A wide path has to be left between plots because of the danger of drift by spray or dust. Toxicity in crops is generally assessed by yields, as in fertilizer experiments: where growth-regulating substances are used a more accurate estimate of toxicity may often be obtained from the morphological reaction of the crops. It is much more difficult to make an accurate assessment of toxicity with perennial than annual weeds. Owing to the inherent variability of biological material, the dosage mortality curve assumes a Sigmoid form. It is thus more accurate to measure the concentration required to kill 50 per cent of the plants—this concentration being known as L.D. 50. The existence of more accurate methods for determining the concentration of herbicide to obtain a 90-100 per cent kill is noted. The time allowed between pre- and post-emergence counts varies with the type of herbicide and weed. Contact types of herbicide are much swifter in action than growth-regulating substances. In order to reduce complications to a minimum, the interval between the counts should be as short as possible, but growth-regulating substances may take up to nine months to be effective on perennial weeds. Complications then arise out of underground spread, regeneration from rosette, and so forth. Thus the only accurate method of assessing the kill of plants is to mark all those weeds counted at the time of treatment. Independent evaluations are made when crop and weed are treated in association. It is pointed out that many other factors such as stage of development, growth rates, and climatic and soil environment, also influence toxicity and selective toxicity, and that the effects must be studied before generalizations about the efficiency of a herbicide can be made. An appendix describes in detail an experiment with DNBP on peas, where *Stellaria media* was the prominent weed.—N.G.S.

1147 CORNELL UNIVERSITY Agricultural Experiment Station. Mem. 298. **Herbicidal properties of petroleum hydrocarbons.** By *J. R. Havis*. 1950, pp. 20.

Tests are reported of the herbicidal properties of thirty-one pure petroleum hydrocarbons in the boiling-point range between 176 to 572°F. The test plants used were carrots, several vegetable species and weeds. The boiling-point range of greatest toxicity was from 280 to 510°F. The aromatics, methyl-naphthalene, dimethyl-naphthalene and diphenyl methane were the most toxic hydrocarbons in the 400-510°F. range. A characteristic of the olefines was their increased toxicity following storage in light. Selective action was obtained on dilution in non-toxic oil and aqueous emulsions. Toxicity appeared to be associated with cell penetration.—P.J.B.

1148 FOSTER, A. C. **How toxic to plants are some of the new insecticides**? *Agric. Chem.* 1950, **5**, 37-9. [Fruit, Veg. Crops and Diseases, Plant Ind. Bureau, Soils and Agric. Engng, U.S.D.A., Beltsville, Md]

The paper summarizes data collected to date in phytotoxicity studies of a number of the organic chlorinated hydrocarbon insecticides applied to greenhouse beds, cold frames and field plots. Results so far include the following: DDT mixed with muck, Chester, Evesboro and Sassafras soils at 25 lb. per ac., remained stable in amount and toxicity to certain vegetable and grain crops over a 4-year period. Technical BHC (12 per cent gamma isomer) mixed with Chester soil at 100 lb. per ac. persisted in the soil over a 3-year period: chemical analysis showed that half the BHC had disappeared during this period. Chlordane persisted in Chester soil for one year without any detectable change in plant response. Toxaphene in Chester and Chester compost soils appeared to lose its toxicity to sensitive plants after 4 to 6 months. Parathion seems to disappear rather rapidly from soils. Studies are still in progress.—P.J.B.

1149 MULLISON, W. R., and HUMMER, R. W. **Some effects of the vapour of 2,4-dichlorophenoxyacetic acid derivatives on various field-crop and vegetable seeds.** *Bot. Gaz.* 1949, **111,** 77-85, bibl. 3. [Dow Chem. Co., Midland, Mich.]

Seeds should not be stored where they will be exposed to the vapours from volatile esters of 2,4-D. Aliphatic (1-5 carbon) esters of 2,4-dichlorophenoxyacetic acid and the isopropyl ester of 2,4-5-trichlorophenoxyacetic acid are sufficiently volatile to affect adversely the germination of numerous species of field-crop and vegetable seeds exposed to such vapours. The degree of severity of the effect is proportional to the time of exposure. The higher aliphatic esters (4-5 carbon) of 2,4-dichlorophenoxyacetic acid are less volatile than the lower esters (1-3 carbon) as determined by the effect of their vapours on the germination of seeds. The sodium and alkanolamine salts of 2,4-dichlorophenoxyacetic acid are apparently not sufficiently volatile to affect [adversely] the germination of air-dry seeds. The ester vapour appears to be absorbed on the seed coat and does not enter the dry seed before germination.—Authors' summary.

Machinery and Equipment

1150 COLBURN, R. A. **Grain and seed cleaning plant.** *World Crops* 1950, **2**, 389-93.

Types of machines used in seed cleaning are considered with particular reference to equipment size, and the machinery needed to fulfil specific requirements. Layouts for single purpose cleaning units and combined plants are illustrated.—E.B.H.

1151 FARM IMPLEMENT AND MACHINERY REVIEW. **Top speed grain handling.** *Fm Impl. Mach. Rev.* 1950, **76**, 919.

An illustrated account of the "Wilder-Steed," self-emptying trailer, demonstrating its easy convertibility to grain use.—E.B.H.

1152 ENGLAND AND WALES, Ministry of Agriculture and Fisheries. "Growmore" Leafl. No. 102. **Combine harvesting and grain storage.** [**n.d.**] pp. 8.

1153 SILSOE, National Institute of Agricultural Engineering. **A report on a study of pea harvesting, summer, 1947**. Silsoe, [**n.d.**] pp. 6, 4 tables. [Mimeographed]

1154 SILSOE, National Institute of Agricultural Engineering. **Report on a farm plant for the drying of grain in storage bins ventilated with conditioned air.** 1949, pp. 26. [Mimeographed]
This bulletin presents current information on grain storage in bins ventilated with slightly heated air and discusses basic principles governing their design. The construction with costs of a farm plant is described, and details are included of the operation and performance of the plant during 1948.—Authors' extract.

1155 SILSOE, National Institute of Agricultural Engineering. **Crop drier engineering development.** Report prepared by *J. Woodforde* and *W. F. Williamson* 1950, pp. 13, 13 figs. [Mimeographed]
A report on the design of a small prototype plant for drying grain in sacks and of a self-contained air heating unit.—Authors' extract.

1156 POWER FARMER. **A new idea in crop drying** *Power Fmr* 1950, **5**, No. 5, 30-1.
A new system of crop drying embodying a method of processing grain in a trailer with a perforated floor is briefly described. No open combustion of fuel in a furnace is employed and crops can be processed at far lower temperatures than in methods where heated air of high humidity is used. A compressor is used to cool a refrigerating coil upon which the moisture in air introduced by a fan is condensed. The dried air then passes over the compressor coil and is thus heated. Additional heat is then supplied by the water cooling system and the exhaust heat of the power unit, which raises the final dried air temperature to 145-165°F. After passing through the crop to be dried, the air is passed back into the air intake duct of the apparatus, where its latent heat can be utilized. Trials have shown that one trayful of grain [amount not specified] can be dried from 25 to 15 per cent moisture content in 2 hours.—P.J.B.

1157 TINGLEFF, N. Mejetaerskning of frøafgrøder. [**Combining seed crops (in Denmark).**] *Dansk Frøavl* 1950, **33**, 129-34.
During the last few years it has become general to use the combine harvester for seed crops such as mustard, and to some extent linseed. Seed crops of mustard, swedes, turnips and rape can be combined direct, or first laid in swaths to after-ripen. Linseed, which unlike the other crops mentioned, does not shed its seed when ripe, is combined direct. As clover seed ripens very unevenly the crop is first laid in swaths to weather. Grass seed can either be combined direct or after placing of the crops in swaths.—R.P.J.

1158 SCOTTON, M. La trattrice agricola di piccola potenza. [**Low power farm tractor.**] *Humus, Milan* 1950, **6**, No. 4, 14-7.
The tractors of Italian and foreign construction described are intended for small farms particularly those on hilly land. In Italy, the large areas of hill land, the small size of the farms and the presence of rows of trees frequently prevent the use of large tractors.—E.B.

1159 ZAPPELLI, P. Una nuova seminatrice. [**A new seed-drill.**] *G. Agric. Domen.* 1949, **59**, 383.
This double-purpose machine sows the seed and distributes the fertilizer in one operation, thus achieving savings in the quantity of fertilizer used and in labour costs. Being localized near the seed, the fertilizer is better utilized by the plant. It is reported that the use of this machine has resulted in an average increase of 8 q. per ha. in the yield of wheat.—E.B.

1160 MAYNE, J. E. **The small tropical farm and mechanisation.** *World Crops* 1950, **2**, 465-8, illus. [Imperial Coll. Trop. Agric., Trinidad, B.W.I.]
Two-wheel horticultural tractors are not as satisfactory as a pair of oxen for the tropical smallholder. The performance of a 76 h.p. crawler tractor [make not given] closely resembles that of two to four oxen. Medium sized tractors are very effective. Rotary cultivation appears to be very successful. Owing to the economic situation, and the lack of skilled mechanics, the benefits of mechanization are likely to be available to the tropical peasant farmer only through co-operation in the use of larger machines.—N.G.S.

1161 SELLSCHOP, J. **Planter plates and new planters.** *Fmg S. Afr.* 1949, **24**, 458. [Coll. Agric., Potchefstroom]
A general description is given of the types of planter plates and planting machines which can be used for sowing maize, groundnut, Sudan grass and bean seed.—K.O.

1162 CUNNINGHAM, R. H. **A mechanical shaking device.** *Sci. Agric.* 1950, **30**, 396-7. [Dom. Lab. Cer. Breed., Winnipeg, Man.]
An illustrated account of a machine designed to mix seed and fungicide, an advantage being its ability to prepare as many as six 1-lb. mixes in one operation, thus enabling considerable quantities of

seed to be handled. Dry or wet disinfectants can be applied simultaneously and an exact count recorded of the number of shakes given the mixtures. The machine may also be used for mixing inoculum with seed, preparing emulsions, etc. Where a large number of small samples is to be shaken, interchangeable trays can be used. The machine consists of three essential parts: a rack holding Mason jars, at an angle of 45°, in semi-cylindrical troughs lined with sponge rubber; a motor-driven mechanism which moves the rack at 300 times per min. through a 3-in. circle, and a resettable counter attached to one of the crankshafts which drive the rack. All these components are mounted on a rigid angle-iron frame.—E.B.H.

1163 COOK, R. L., and PEIKERT, F. W. **A comparison of tillage implements.** *Agric. Engng, St. Joseph, Mich.* 1950, **31**, 211-4. [Michigan Agric. Expt Sta., Lansing]

The effects of several types of tillage machines on the yield of a number of crops were compared on three soil types. Results indicated that: (1) under average soil conditions where the ground was almost free of vegetation, yields were about the same after using the various test machines as after conventional tillage practices; (2) where beans followed *Melilotus alba* or *Bromus inermis*, yields on soil prepared by the rotary-type tiller and the auger-type plough were substantially lower than those from soil tilled by the other methods used; (3) the once-over soil preparation possible with the plough-packer or mulcher attached directly to the conventional plough appeared to offer possibilities for lowering the cost of preparing seed beds whilst maintaining yields at a level comparable to those obtained after conventional tillage methods.—P.J.B.

1164 WILSON, J. D. **Rowcrop weed control with a shielded boom.** *Ohio Fm and Home Res.* 1950, **35**, 21-2.

Details are given of the performance and characteristics of a two-row, wheel-barrow type, shielded-boom sprayer for weed control in broad-leaved row crops.—P.J.B.

1165 COX, P. D. **Converting a standard Sun Header to reap peas.** *J. Dep. Agric. S. Aust.* 1950, **53**, 413-6.

An illustrated description of a very ingenious adaptation of an 8 ft. pendulum knife-drive Sun Header machine for use in harvesting pea crops.—K.O.

Diseases and Pests

1166 FOISTER, C. E. **International aspects of plant quarantine.** *Scot. J. Agric.* 1950, **30**, 111-4.

1167 GRAINGER, J. **Crops and diseases. 1. A digest of results of the Disease Phenology Plots maintained and recorded by the Department of Plant Pathology, West of Scotland Agricultural College, Auchincruive, Ayr, 1945-49.** (Res. Bull. 9.) [**n.d.**] pp. 51, bibl. 6, illus.

1168 LUCAS, J. R. Méthode de lutte contre la Scutigerelle immaculée (*Scutigerella immaculata* Newport). [**Control measures against *Scutigerella immaculata*.**] *C. R. Acad. Agric. Fr.* 1949, **35**, 475-7, bibl. 3.

Stubble-burying and the use of farmyard manure favour *Scutigerella* infestation of maize and beans. In Pays Basque, deep ploughing can be practised as a means of control. The use of lime, calcium cyanide, paradichlorobenzene and carbon disulphide are less effective, and more troublesome, control methods. Recent research in agricultural chemistry has proved the value of insecticides against underground insects. The results of trials show that 20 to 30 kg. HCH and 10 kg. DDT per ha. gave the best control. However, the author does not recommend the use of more than 15 to 20 kg. HCH as it may injure the crop. Experiments are proceeding with mixtures of insecticides combined with manures.—K.O.

1169 COHIC, F. Les insectes nuisibles aux plantes cultivées dans les Wallis et Futuna. [**The insects harmful to crops in Wallis et Futuna (Pacific Ocean).**] *Agron. trop.* 1950, **5**, 563-81.

1170 RIPPER, W. E. **Pest killers must not be man killers.** *World Crops* 1950, **2**, 474-7, bibl. 4, illus.

As many insecticides are toxic, it is essential that operators should be adequately protected. This problem is particularly acute in the tropics. The need for legislation to protect consumers from toxic residues on sprayed crops is urged.—N.G.S.

1171 SUDAN, Ministry of Agriculture. Mem. Res. Div. No. 5. **The Sudan Dioch in grain growing areas. Birds causing crop damage in the Sudan.** By *C. E. Wilson.* 1948, pp. 21, illus.

The first part of this bulletin is a monograph on the Dioch or weaver bird (*Quelea quelea aethiopica*), which causes serious crop damage in the White Nile area. The second part gives information on twenty bird pests. Photographs of the birds are given.—N.G.S.

1172 SOUTH AFRICA, Department of Agriculture. Sci. Bull. No. 254. (Bot. and Pl. Path. Ser. No. 9.) **A South African virus disease of crucifers.** By *A. F. Hean.* [**n.d.**] pp. 15, bibl. 29, illus. 3.

A virus disease affecting crucifers has been found in the Transvaal. The symptoms and the experimental host range are given. The temperature range of the disease is apparently great, symptoms having been observed in warm and cold weather. The disease is readily transmitted by *Myzus persicae* and *Brevicoryne brassicae*, both common on crucifers in the Transvaal.—From author's summary.

1173 South Africa, Department of Agriculture. Sci. Bull. No. 265. (Bot. and Pl. Path. Ser No. 12). **Some forms of streak virus occurring in maize, sugar-cane and wild grasses.** By *A. P. D. McClean*. 1947, pp. 39, bibl. 10. [Received 1950]. [Bot. Sta. Durban]

The streak viruses isolated from naturally infected plants of maize, Uba-sugar-cane and certain wild grasses were compared by studying their host range, the host reaction and their rate of development in maize. This revealed the existence of new forms which were easily distinguished from the Uba and maize viruses already described by Storey in *Rep. Proc. Imp. Bot. Conf.* 1924. A brief description of the more important distinguishing characters of each is given. A record of the natural occurrence of both the Uba- and A-viruses together in a plant of Uba-sugar-cane is described.—From author's summary.

1174 Naude, T. J. **Research on the control of insect pests.** *Fmg S. Afr.* 1949, **24**, 574-81.

Life history studies of the black maize beetle [*Heteronychus sanctae-helenae*] have been continued. Maize seed treatment with 20 per cent BHC dust gave almost 100 per cent control of this beetle. A top-dressing of 1 per cent DDT powder controls the maize stalk borer [*Busseola fusca*]. It was shown that by sowing at the correct time [not specified] much of the usual infestation of the maize stalk borer can be avoided. Seed treatment with BHC failed to control cutworms [*Euxoa segetis*]; 5 per cent DDT dust gave control of the army worm [*Laphygma exempta*].—N.G.S.

1175 United States, Department of Agriculture, Bureau of Entomology and Plant Quarantine. E-796. **Preliminary tests of plant materials as insecticides.** By *G. T. Bottger* and *M. Jacobson*. 1950, pp. 35. [Rotoprint]

1176 United States, Department of Agriculture. Fmrs' Bull. No. 1990. **Habits and control of the fall armyworm** [*Laphygma frugiperda*.] By *P. Luginbill*. 1950, pp. 11.

1177 United States, Department of Agriculture. Tech. Bull. No. 980. **Comparative studies of three soil fumigants for wireworm control.** By *W. C. Cook*. 1949, pp. 22.

Comparative laboratory and field experiments were carried out to determine the effectiveness of ethylene dibromide, dichloronitroethane and chlorinated propane-propylene for wireworm control. In plot infection experiments in silt loam and fine sandy loam soils, ethylene dibromide was the most toxic to wireworms, followed by dichloronitroethane. Dichloronitroethane was most effective at temperatures below 10°C. Chlorinated propane-propylene was the most effective in compact soil; ethylene dibromide and chlorinated propane-propylene in loosened soil. The results of large-scale field trials with commercial fumigant applicators and large and small plough applicators are reported. Soil sorption and vertical diffusion losses are discussed and recommendations made for cultivations and rates of application of the various fumigants.—From author's summary.

1178 Mead, H. W., Broadfoot, W. C., and Machacek, J. E. **A study of some seed-borne diseases of cereals in Canada. I. Comparison of seed testing methods.** *Sci. Agric.* 1950, **30**, 350-60, bibl. 3. [Bot. and Plant Path. Div. Sci. Service, Agric. Dept Ottawa]

As a result of the agreement between the results of germination and seed-borne fungi tests in non-sterile soil and non-sterile sand, it is suggested that either of these media can be used for laboratory tests for seed-borne fungi.—P.J.B.

1179 Alexander, L. J., and Simon, R. H. **How to control "damping-off" on seedlings.** *Ohio Fm and Home Sci.* 1949, **34**, 85-8.

Injuries caused to seedlings by heavy doses of fertilizer and by damping-off are discussed and methods of soil sterilization by steam and formaldehyde described.—P.J.B.

1180 Connecticut Agricultural Experiment Station. Bull. 508. **Fungicidal action of metallic alkyl bisdithiocarbamates.** By *R. W. Barratt* and *J. G. Horsfall*. 1947, pp. 51, bibl. 33.

The bulletin reports the results of 7 years' work on the fungicidal action of the bisdithiocarbamates. Disodium ethylene bisdithiocarbamate (DSE) by itself gave erratic results as a fungicide in the field. In laboratory tests, mixtures of DSE and $ZnSO_4$ and $Ca(OH)_2$ proved effective. Studies made on these mixtures showed that the stability of DSE in the presence of $ZnSO_4$ and $Ca(OH)_2$ was due to the action of CO_2 in forming zinc ethylene dithiocarbamate in weathered spray residues. The fungicidal toxicity of thirty-six analogues and homologues of DSE were studied and the results are given. The mechanisms of the fungicidal action of these compounds are discussed.—P.J.B.

1181 Anwar, A. A. **Factors affecting the survival of *Helminthosporium sativum* and *Fusarium lini* in the soil.** *Phytopathology* 1949, **39**, 1005-19.

1182 Wallen, V. R., Sutton, M.D., and Skolko, A. J. **The effect of actidione on the growth of certain pathogenic fungi and the germination of pea seed.** *Phytopathology* 1950, **42**, 156-60.

Preliminary tests were carried out to determine the effect of actidione, an antibiotic isolated from cultures of *Streptomyces griseus*, on certain seed-borne fungi and its possible value as a seed-treating agent. The results reported indicate a wide variation in the effect of actidione on the various fungi tested, those with thin-walled, light-coloured spores being most affected. In four samples of Lincoln peas, known to be internally infected by *Ascochyta pisi*, which were soaked in actidione solutions of 1, 15, 40 and 225 ppm., the percentage germination was 84, 80, 72 and 52 respectively, compared with 94 per cent for the control. It was evident that even at concentrations as high as 225 ppm., actidione would not control internally-borne *A. pisi* and that the seed germination was reduced as the actidione concentration increased.—P.J.B.

1183 Le Beau, F. J. **Pathogenicity studies with *Colletotrichum* from different hosts on sorghum and sugar cane.** *Phytopathology* 1950, **40**, 430-8.

1184 Texas, Agricultural Experiment Station. Circ. 124 **Plant diseases in Texas and their control.** By *A. A. Dunlap*. 1949, pp. 74.

1185 Williamson, C. E. **Ethylene, a metabolic product of diseased or injured plants.** *Phytopathology* 1950 **40**, 205-8. [Cornell Univ., Ithaca, N.Y.]

The ethylene production of the diseased and healthy tissue of twelve plant species was determined and measured biologically by the response of etiolated pea seedlings. Nineteen pathogens were investigated for their ability to stimulate ethylene production in plant tissues. Certain diseased tissues showed a markedly higher rate of ethylene evolution than comparable healthy tissue; the evolution of ethylene was apparently a response to tissue injury and occurred only as long as the plant tissues were alive. The rapid development of yellow coloration and early abscission of infected leaves appears to be correlated with the production of large quantities of ethylene by the diseased leaves.—From author's summary.

1186 Bishopp, F. C. **Allethrin.** *Agric. Chem.* 1950, **5**, 22-6 and 76-7, bibl. 6. [Ent. and Plant Quarantine Bureau, U.S.D.A., Washington, D.C.]

The paper reports biological tests of the synthetic pyrethrin-like ester, allethrin, the allyl homologue of Cinerin 1. Preliminary results indicate that allethrin is superior to natural pyrethrins against several insect species, about equally toxic to others and decidedly inferior against certain pests of field crops.—From author's summary.

1187 Connecticut Agricultural Experiment Station. Bull. 505. **Japanese beetle (*Poppillia japonica*)—life history and control.** By *J. C. Schread*. 1947, pp. 20.

1188 Agati, J. A., and Clara, F. M. **Preliminary tests to determine the efficacy of D-D as a soil fumigant against root knot nematode.** *Philippine J. Agric.* 1950, **14**, 233-41.

The paper reports preliminary tests of the efficacy of DD (dichloropropane-dichloropropylene) as a soil fumigant against root-knot nematode, to which rice and sugar beet seedlings are susceptible. Tomato seedlings were used in the tests the results of which were as follows: in the DD-treated plots, 78.2 per cent of the plants were free of root-knot nematode and only 3.75 per cent developed a few small root knots. In the untreated plot 71.42 of the plants were attacked by the nematode, only 1.9 per cent being free.—P.J.B.

1189 Argentina, Ministerio de Agricultura de la Nacion. Division de Inmunologia Vegetal. Inf. No. 8. Imformaciones de interes para los trabajos de seleccion de plantas resistentes a la carie. [**Information of interest for the work of selecting smut resistant plants.**] 1948, pp. 2. [Mimeographed]

CEREALS

MISCELLANEOUS

1190 Watson, D. J. **Inflammability of cereal crops in relation to water-content.** *Emp. J. exp. Agric.* 1950, **18**, 150-62, bibl. 1. [Rothamsted Expt Sta., Harpenden]

Barley crops growing in the field became inflammable, in the sense that a fire continued to spread and did not die out spontaneously, when the water-content of the straw fell below about 30 per cent of fresh weight. Laboratory tests on isolated barley and wheat straws showed that a flame was propagated indefinitely along a straw when its water-content was lower than about 30 per cent. In barley, a node acted as a barrier to the passage of flame along an isolated stem when the water-content was above 25 per cent. Measurements of the changes during ripening in the water-content of oats, wheat, and barley crops were made in 1941, an abnormally wet season. The water-content of oats and wheat straw never fell below the critical value for inflammability, that of barley straw fell to the critical value only when the crop was left standing for about 2 weeks after it was dead ripe. It is suggested that delay in harvest after the stage when the crop becomes fit for cutting is probably the chief source of fire-risk. A multiple regression on time, accumulated rainfall, and maximum daily temperature accounted for 50-80 per cent of the variance between sampling times in the water-content of wheat and barley straw. Variation in the water-content of oat straw was apparently not dependent on rainfall. The water-content of barley straw was more sensitive to rainfall and temperature than that of wheat straw. Most of the positive deviations of observed values of water-content from values calculated from the regression equations occurred on days when surface moisture was present in the plants.—Author's summary.

1191 HERNÁNDEZ-MEDINA, E., and SHRIVE, J. W. **Calcium-boron relationships in the nutrition of corn and the distribution of these elements in the plant.** *J. Agric. Univ. Puerto Rico* 1946, **30**, 253-91, bibl. 51.

Detailed studies are reported of the qualitative and quantitative response of corn plants to substrates containing six different levels of calcium and eight different levels of boron concentration. Among the summarized results of the studies are the following. 1. The total and soluble boron contents of the plants were largely independent of the calcium content of the substrates. 2. Boron deficiency symptoms were not apparent where low calcium and low boron substrate contents were associated, but at calcium substrate concentrations above 50 ppm. symptoms became apparent and increased in severity as the calcium concentations increased. 3. The calcium content of the plants was largely determined by the calcium content of the substrate; it was independent of the boron content of the substrates, except that where plants were grown on substrates with high boron and calcium contents, the calcium content of the plants was higher than for high calcium—low boron content substrates. 4. The boron toxicity associated with high boron substrate contents, decreased as the calcium substrate content increased. 5. The accumulation of boron was greater in older plant tissues than in tissues where meristematic activity was greatest. 6. The quantitative relationship between calcium and boron in plants plays an important part in their metabolic activities. Boron deficient plants had a high Ca/B ratio, whilst this ratio in plants with boron toxicity was very low.

The results indicate that a combination of high calcium and high boron in the substrate favours a more normal plant metabolism than a combination of low calcium and high boron and that a certain balance of calcium to boron must exist within the plant for normal growth and metabolism to take place.—P.J.B.

1192 HILLESTAD, O. De nye høstemetoder og kornkvaliteten. [**The new harvesting methods and quality of grain (in Norway).**] *Norsk Landbr.* 1950, **16**, 255-7, 273-7.

The investigations on combine harvesting conducted in Sweden in 1947 and 1948 by the Institute of Agricultural Engineering are reviewed and experience gained in Norway is discussed. It is emphasized that the crop must be allowed to ripen until the moisture content has fallen below 20 per cent before combining with direct threshing.—R.P.J.

1193 GRØNTVED, P. Vintersædens Saaning. [**The sowing of winter cereals (in Denmark).**] *Ugeskr. Landm.* 1950, **95**, 607-9.

Experiments at the State Experiment Stations showed that autumn-sown rye is frequently superior to autumn-sown wheat, not only on the light soils of Jutland but also in many instances on the clay soils of the Islands, and that both cereals are somewhat uncertain compared with spring-sown grain crops, as, during severe winters, wheat is injured by frost and the yield of rye is affected by unfavourable weather during the flowering period. The importance of suitable preceding crops is emphasized and questions relating to manuring, choice of varieties and dates of sowing are discussed.—R.P.J.

1194 LUT, F. A., and PLAVSKIĬ, G. E. [**The most suitable times of sowing winter cereal crops for the western regions of the Ukraine.**] [Russian]. *Sovet. Agron.* 1950, **8**, No. 8, 38-44.

The most suitable period for autumn sowing of cereals is the first and second decade of September. With the postponement of sowing to the end of September and to October there is a sharp decline in the yields of grain and straw. In dry years the sowing of winter cereals should be begun earlier.—R.P.J.

1195 FLINN, Ruth. **Cereals in South Africa. A select bibliography.** 1948, pp. 20. [Mimeographed]

1196 GEORGIA Experiment Station. Circ. 162. **Uniform small grain variety tests in Georgia, 1948-49.** By *V. R. Gore* and others. 1949, pp. 20.

1197 GOPALA RAO, H. G., and GOVINDARAJAN, S. V. **Increased yields of ragi through zinc salt fertilization.** *Curr. Sci.* 1950, **19**, 242, bibl. 2. [Agric. Res. Inst. Bangalore]

This is a preliminary note of the effect of boron, copper, zinc, and combinations thereof, upon *Eleusine coracana*. The results indicate that the application of 5 lb. zinc sulphate per acre, on Bangalore soil, gave an increase in the total crop of about 23 per cent, the individual yields of dry grain and straw being raised by about 12 per cent. Large scale trials are now in progress.—N.G.S.

1198 COULTER, J. K. **Peat formations in Malaya.** *Malay. agric. J.* 1950, **33**, 63-81, bibl. 13.

Results of pot experiments with paddy and maize growing in peat have shown that Malayan peat of the Telok Forest Reserve, Selangor, will not support a good growth of paddy but that a dressing of NPK greatly improves the yield and appearance of the plants.—From author's summary.

1199 ÅKERMAN, Å. Bedömning av stråsädessorters odlingsvärde med ledning av jämförande försök. [**Assessment of the value of cereal varieties on the basis of comparative trials.**] *Sverig. Utsädesfören. Tidskr.* 1950, **60**, 277-84.

A paper read at the extraordinary meeting of the Swedish Seed Association during Agricultural Week, 1950.—R.P.J.

1200 THORPE, H. C. **A note on the release of some new cereal varieties—II.** *E. Afr. agric. J.* 1950, **16**, 61, bibl. 1. [Dept. Agric., Kenya]

See *Fld Crop Abstr.* 3, Abs. 97. The following cereal varieties have been released for sowing in 1950. Wheat: Kenya Settler, Kenya Ploughman and Mark II. Barley: Canadian Mariout.—K.O.

1201 ILLINOIS Agricultural Extension Service. Circ. 658. **Weed control in small grains.** By *F. W. Slife, R. F. Fuelleman, W. O. Scott* and *G. E. McKibben*. 1950, pp. 12.

A practical guide to the use of 2,4-D and the selective dinitro herbicides for weed control in small grains.—P.J.B.

1202 LACHMAN, W. H. **Weeding corn with chemicals.** *Proc. Amer. Soc. Hort. Sci.* 1949, **54**, 417-26, bibl. 40. [Massachusetts Agric. Expt Sta., Amherst, Mass.]

Tests showed that several herbicides gave effective weed control in sweet corn for a period of between 2 and 8 weeks. 2,4-D and di-nitro selective herbicides, such as Simox and Dow Selective, were effective in killing broad-leaved weeds, but had little effect on grasses. Pre-emergence treatments with 2,4-D and Dow Contact and General weed killers gave effective control of both broad-leaved and grass weeds. Delaying 2,4-D applications until 6 days after sowing the corn gave much improved weed control. 2,4-D malformations in corn were much less pronounced following pre-emergence treatments. Applications of cyanamide at a rate of 600 lb. prevented weed growth for several weeks; later, when weeds appeared, both weeds and corn were stimulated by the treatment. The results of the use of the di-nitro herbicides were promising, but it is thought that further trials are necessary to determine the hazards of using these materials. From author's summary.

1203 TEMPLEMAN, W. G., and HALLIDAY, D. J. **Field experiments in selective weed control by plant-growth regulators. I. Weed control in cereal crops. II. The effect of plant-growth regulators upon cereal crops.** *Emp. J. exp. Agric.* 1950, **18**, 19-30, 170-6, bibl. 41.

Experiments conducted 1943-5 showed that MCPA (sodium salt) dust applied at 2 lb. active material per acre effected a 70-100 per cent kill of *Sinapis arvensis*, *Thlaspi arvense*, *Chenopodium album*, and *Raphanus raphanistrum*, and killed or checked many other weeds when applied at higher rates. Young seedlings of *Viola tricolor* and *Chrysanthemum segetum* were controlled when the herbicide was applied at a rate of 4 lb. active material per acre to the soil before seedling emergence. MCPA was applied as a dust and as a spray at rates up to 8 lb. per acre to wheat, barley and oats 3-8 in. high without adverse effect on yield, but applications of 16 lb. per acre when applied in spray form sometimes caused damage. Applications at the time of sowing, or when crops were more than 10 in. high, reduced yields in some cases. There was no consistent difference between the effects of the sodium salts of MCPA and DCPA applied at equivalent rates.—E.B.H.

1204 ANDERSEN, S., and HERMANSEN, J. **Effect of hormone derivatives on cultivated plants. II. Spraying of cereals with 2,4-D and 4K-2M at different dates.** *K. VetHøjsk. Årsskr.* 1950, 141-203, bibl. 17. [Department of Plant Culture, Denmark]

The main object of the experiments conducted in 1948 was to ascertain how the date of spraying affected the number and character of abnormalities. The commercial preparations Agroxone and Herbatox were used. Wheat, barley and oats were sprayed. It was found that spraying the plants at certain developmental stages involves a greater risk of abnormalities and probably a decrease in yield. In barley the susceptible stage lasts from the time when all the plants have two leaves and 25 per cent three leaves, until 75 per cent have four leaves; in oats from the time when all the plants have three leaves and 75 per cent four leaves, until 25 per cent have six leaves.—R.P.J.

1205 DONÀ dalle ROSE, A. Fitormoni ed erbicidi fitormonici. [**Plant hormones and hormonal herbicides.**] *Ann. Sta. chim.-agr. sper. Roma*, 1949, **3**, publ. No. 12. pp. 16, bibl. 48.

A review is given of results of experiements in Italy. Because of abundance of labour it is not considered advisable to extend the practical application of these herbicides in Italy. The bibliography gives references to Italian works.—E.B.

1206 PARKIN, E. A. **The control of insects infesting stored foodstuffs.** *World Crops* 1949, **1**, 103-6. [Pest Infest. Lab., Slough, England]

Annual losses in world cereal crops due to insect infestation during storage and transport average 10 per cent. This article reviews the problem and the measures recommended by F.A.O. to bring about its solution.—E.B.H.

1207 LEUKEL, R. W. **Use of chemicals in cereal seed treatment.** *Agric. Chem.* 1950, **5**, 27-30.

1208 WESTON, W. A. R. D. **Rust and mildew of cereals.** *Farming* 1950, **4**, 232-6.

The cause and course of rust (*Puccinia* spp.) and mildew (*Erysiphe graminis*) are discussed. Rust is not severe in Britain, *P. glumarum* and *P. triticina* being the most serious. These are almost non-existent in Scotland but are more prevalent, though rarely severe, in England and Wales. Little is known about mildew, which is sometimes responsible for heavy cereal losses.—E.B.H.

1209 VILMORIN, R. DE Traitement pratique des charbons internes des céréales. [**Practical treatment of loose smuts of cereals.**] *C. R. Acad. Agric. Fr.* 1949, **35**, 674-5.

An electric machine is described which gives hot-water treatment to grain to render it free from spores of loose smut (*Ustilago nuda tritici* and *Ustilago nuda hordei*). Although the machine is too cumbersome and expensive to use on a commercial scale it is useful for treating grain from trial plots. The treatment consists of soaking the grain first at a temperature of 45°C. in a tank holding 1600 l. of water and then in a tank holding 200 l. at a temperature of 51.5°C. The process takes two hours. The moisture content of the grain coming from the second tank is 40 per cent. This is reduced to 14 per cent by treatment with hot air for two period of 4 hours, separated by a period of 8 hours of cooling. Experiments have shown a 75 per cent germination of the grain after the hot-water treatment.—K.O.

1210 RASTEN, J. Varmtvannsbehandling av bygg og vårhvete mot naken sot. Resultater fra praksis. [**Hot-water treatment of barley and spring wheat to combat loose smut (*Ustilago nuda*). Results from practice (in Norway).**] *Tidsskr. norske Landbr.* 1950, **57**. 113-21.

In their experiments Jørstad and Lier found that steeping the grain in hot water for a longer period than that specified in the older method was completely effective against loose smut and that it had no serious ill-effect on germination. These investigators recommend for wheat steeping for 2 hr. in water at 47°C. and for barley steeping for 1.5 h. at 47°C. The grain should then be cooled as soon as possible in cold water and then dried. The method has been varied slightly ; wheat being steeped for 2 hours at 46°C. and barley, for 2 hours at 45°C. The result was excellent. In wheat no smutted ears were found : but in barley there were traces of smut in two or three instances. Germination was reduced slightly by this treatment : in 23 wheat lots on the average by 8 per cent and in 32 barley lots by 4 per cent.—R.P.J.

1211 CANADA, Department of Agriculture. Division of Botany and Plant Pathology. Science Service. Publ. 834. Fmrs' Bull. 161. **Treatment of cereal seed.** By *J. E. Machacek, R. C. Russell* and *L. E. Tyner*. 1950, pp. 12.

Tabulated data are given showing the resistance to *Tilletia caries*, *T. foetida*, *Ustilago tritici*, *U. kolleri*, *U. avenae*, *U. hordei*, *U. nigra* and *U. nuda* of a number of wheat, oat and barley varieties. The various kinds of seed treatment for these smuts are outlined and the various smuts attacking wheat, oats and barley described.—P.J.B.

1212 UNITED STATES, Department of Agriculture. Agricultural Research Administration, Bureau of Plant Industry, Soils and Agricultural Engineering. No. 31. **Report of co-operative uniform cereal rust observation nurseries for the year 1949.** 1950, pp. 23. [Mimeographed]

Data are summarized of the reaction of spring and winter wheat varieties to *Puccinia graminis tritici* and *P. rubigo-vera tritici*, the reaction of oat varieties to *P. graminis avenae* and *P. coronata avenae*, and the reaction of barley varieties to *P. graminis* and *P. hordei*, from tests at a total of 116 rust observation nurseries in the U.S. and at Winnipeg, Canada.—P.J.B.

1213 UNITED STATES, Department of Agriculture. Tech. Bull. No. 1005. **Anthracnose of cereals and grasses.** By *G. W. Bruehl* and *J. G. Dickson*. 1950, pp. 37.

1214 AGRICULTURAL GAZETTE OF NEW SOUTH WALES. **Purple patch of cereals.** *Agric. Gaz. N.S.W.* 1950, **61**, 295-6.

This root disease of cereals is caused by the soil-inhabiting fungus *Rhizoctonia solani*, and is most prevalent in crops growing in lime-deficient soils. The practice of bare fallowing and the application of sulphate of ammonia at the rate of 1 cwt. per acre to known infected areas, before sowing or broadcast in July and August, assists in the control of the disease.—K.O.

1215 ANDERSON, C. W. **Weevil in stored grain.** *J. Dep. Agric. S. Aust.* 1950, **53**, 394-8.
Besides giving a description of the life history and habits of the principal insect pests of stored grain, the author stresses the need for careful attention to harvesting machinery and storage sheds to prevent the infestation of newly harvested grain.—Extract.

1216 ARGENTINA Ministerio de Agricultura de la Nacion. Division de Inmunologia Vegetal. Inf. No. 9. Informaciones de interes para los trabajos de seleccion de plantas resistentes a *Ustilago tritici*. [**Information of interest for the work of selecting plants resistant to *Ustilago tritici*.**] 1948, pp. 2. [Mimeographed]

1217 STRAUSS, A. R. "El juijuaco," plaga del arroz y maiz. [***Euetheola bidentatus*, plague of rice and maize**]. *Agricultor Venez.* 1950, **15**, No. 143. 6.
Euetheola bidentatus, a beetle which attacks rice and maize, can be controlled by spraying with a 25 per cent solution of Octacloro, or by applying 10 per cent DDT dust.—N.G.S.

WHEAT

1218 BOAVENTURA, F. A. T. Algumas considerações sobre o melhoramento do trigo em Angola. [**Some factors affecting the improvement of wheat in Angola.**] *Agron. Angolana* 1949, **2**, 117-137, bibl. 10. [English summary]

1219 LEE, J. W., CLARE, L. E. A., and UNDERWOOD, E. J. **The influence of crop rotation on the thiamin, riboflavin and nitrogen contents of wheat.** *Aust. J. exp. Biol. med. Sci.* 1949, **27**, 533-42, bibl. 17. [Inst. Agric., Univ. Western Australia]
Small increases were found in the average nitrogen and thiamin contents of wheat from rotations which included a crop legume for one or two years. Considerable variation in the riboflavin content of the wheat samples was found, but no obvious relationship was discernible between riboflavin content and the rotation in which the wheat was grown. A positive correlation was found between the nitrogen and thiamin contents of wheat samples, but little correlation was found between nitrogen and riboflavin or thiamin and riboflavin. In the short rotations studied (maximum four years) the effect of the legume on yield of wheat was much greater than the effect on nitrogen and thiamin contents. The possible influence of much longer rotations, including a number of years of legume pasture, is discussed.—From authors' summary.

1220 FAJERSSON, F. Salpeterövergödsling till vete. Nya resultat från gödslingsförsök på Weibullsholm. [**Top dressing of wheat with calcium nitrate. New results from manurial experiments at Weibullsholm Plant Breeding Institute, Landskrona, Sweden.**] *Agri. Hortique Genetica* 1950, **8**, 43-64. [German and English summaries]
Experiments were begun in 1942 and concluded in 1948. The calcium nitrate was applied in two ways: in one the whole quantity was given at the normal time, and in the other it was divided into two, or three, top dressings. In the latter case one part was given at the normal time and the second at the time of earing. A third dressing was in some cases given at the time of flowering. With winter wheat a higher yield was obtained when the calcium nitrate was divided and the protein content of the kernels was higher when one dressing was applied late. With spring wheat, the highest yield was obtained when the calcium nitrate was not divided, but the protein content and bulk weight were higher with divided application. With both winter and spring wheats the gluten content increased relatively more than the protein content when calcium nitrate was applied in two, or three dressings.—R.P.J.

1221 BELOZEROVA, N. A. [**Experimental work with winter wheat in the Omsk province.**] [Russian] *Agrobiologija* 1949, No. 3, pp. 142-59.
Experiments in 1948, like those of previous years, showed that even varieties with such poor frost resistance as Ukrainka and Novokrymka, overwintered well when sown on stubble of summer corn. Semi-winter wheats from Syria, Egypt and Turkey and summer wheats, when sown later, also winter well. Taking a 3-year average, the yield of grain was 18.3 per cent larger when sown on stubble than when sown on fallow.—R.P.J.

1222 AGRICULTURAL GAZETTE OF NEW SOUTH WALES. **Frost injury of wheat.** *Agric. Gaz. N.S.W.* 1950, **61**, 189-91.
Recommended control measures for preventing frost injury to wheat include, sowing varieties at the correct time as determined by their seasonal characters. Early-maturing varieties should be sown late and in a well-compacted seed bed. Frost-susceptible varieties, such as Charter, Ford, Pusa 4, Kendee and Gabo, should not be sown in low-lying areas liable to frost. On irrigable land, watering when frost is imminent assists in reducing losses, though the danger is increased if the frost is prolonged. Crops which are too forward in growth before frosts occur should be eaten off by stock.—K.O.

1223 AUSTRALIA, Commonwealth Scientific and Industrial Research Organization. Bull. No. *224*. **Wheat in Victorian bulk depot.** By *F. Wilson*. 1949, pp. 47, figs. 17.

1224 CLYDESDALE, C. S., and MILES, L. G. **Wheat growing in Queensland.** *Qd agric. J.* 1950, **70**, 311-37, and **71**, 1-25.
The article is a review of the subject under the following headings :—soil types, cultural methods, varieties, seed treatment and storage, sowing, harvesting and marketing. A description is included of the use of wheat for grazing and hay, and of the major pests of the crop.—K.O.

1225 CORNISH, E. A. **The influence of rainfall on the yield of wheat in South Australia.** *Aust. J. sci. Res.* Ser. B. 1950, **3**, 178-218, bibl. 12. [Univ. Adelaide]

1226 GROGAN, F. O. **Wheat yields and variability in Western Australia (1929-30 to 1946-7).** *J. Aust. Inst. agric. Sci.* 1949, **15**, 135-41. [Dept Comm. and Agric., Canberra, A.C.T.)
An account is given of the variations in wheat yields due to climatic, soil and management factors over the 18-year period.—K.O.

1227 MEXICO. Secretaria de Agricultura y Ganaderia. Folleto de divulgacion No. 4. Metodos que pueden aumentar la produccion de trigo en Mexico. [**Methods by which wheat production can be increased in Mexico.**] By *N. E. Borlaug* and *J. A. Rupert*. 1949, pp. 24, illus. [English summary, pp. 23-4].
Wheat is grown under a wide variety of conditions in Mexico, mainly under irrigation in the winter months when its average yield is 11 bu. per ac. The common varieties are of obscure and mixed origins, many different types and sometimes species, often being found in the same field. The four main species are *T. vulgare*, *T. compactum*, *T. durum*, and *T. turgidum*. The common varieties of bread wheat are highly susceptible to rusts. The adoption of sounder agronomic practices, the use of improved varieties and the maintenance of pure seed stocks are urged. At present, much of the agricultural practice is very primitive.—N.G.S.

1228 FILHO, J. C. Cultura do trigo. [**The cultivation of wheat.**] 1948, pp. 53, illus.
A monograph on wheat, its requirements and its cultivation with special reference to Brazil.—N.G.S.

1229 TORSSELL, R., and ÅKERBERG, E. Svalöfs Odinvete, 01392. Ny höstvetesort för mellersta Sverige. [**Svalöf Odin wheat, 01392. A new variety of winter wheat for Central Sweden.**] *Sverig. Utsädesför. Tidskr.* 1950, **60**, 190-207, [English summary].
Svalöf Odin wheat was obtained from the cross Ergo × Gluten and placed on the market in 1949. Its yield is 8 to 10 per cent higher than that of Ergo and it is also superior to the other varieties of Central Sweden in grain yield. Odin is more hardy than Ergo and approximates to Gluten in this property. In earliness, Odin occupies an intermediate position between Ergo and Gluten. It is characterized by very stiff straw, and in this respect is not surpassed by any of the other autumn wheat varieties of Central Sweden. In quality, 1000-grain weight, hectolitre weight, and baking quality Odin is equal to the other autumn wheat varieties of Central Sweden.—R.P.J.

1230 FAJERSSON, F. Pondusvårvetet alltjämt främst i de officiella försöken. [**Pondus spring wheat constantly first in the official trials (in Sweden).**] *Weibulls Årsbok* 1950, 9-12.
In the 1950 Weibull's Yearbook a detailed report is given on Weibull's Original Pondus wheat which showed that in the official trials up to and including 1948 this variety surpassed all its competitors in yield. In the official trials of 1949 it also gave excellent results. The yield of Pondus is on the average 5 per cent higher than that of the new Svalöf variety Ella. Pondus cannot profitably be grown as far north as can Kärn II : it is 2 to 3 days later than the latter variety. Pondus has, since 1942, been compared with the Svalöf variety Progress which ripens a few days later. On the average Pondus has given a 12 per cent higher yield than Progress.

Within its cultivation area Pondus is a stable and reliable variety which under the most varying seasons has given a higher grain yield than any other spring wheat variety. It is about equal to Kärn II in stiffness of straw.—R.P.J.

1231 FAJERSSON, F. Weibulls original Eroicavete II Ny sort, härdigare än det gamla Eroicavetet. [**Weibull's Original Eroica wheat II. A new variety more hardy than the old Eroica wheat.**] *Weibulls Årsbok* 1950, 1-4.
On the basis of tests conducted so far, it can be stated that Eroica II gives about the same yield of grain as Eroica and is at least its equal in stiffness of straw. The two varieties appear to be equal in quality. In hardiness Eroica II is much superior to Eroica.—R.P.J.

1232 STRAND, E. Resultater av sortsforsøk med høsthvete. [**Results of varietal trials with autumn wheat (in Norway).**] *Norsk Landbr.* 1950, **16**, No. 17, 308-11.
A summary is given of Melding No. 139 from *Norges Landbruks høgskoles Åkervekstforsøk* to be published in 1951.—R.P.J.

1233 Lenglen, —. A propos du soi-disant blé des Pharaons. [**Concerning the so-called wheat of the Pharaohs.**] *C. R. Acad. Agric. Fr.* 1949, **35**, 572-3.

Because of its inferior yield and low baking quality, Pharaoh wheat (also called Osiris wheat, Miracle wheat or Egyptian wheat) is of little agricultural value. Its main interest is as a curiosity.—K.O.

1234 Triulzi, G. A. Grani primaverili sperimentati in Val di Susa a 1865 m.s.l.m. [**Trials with spring wheats in Val di Susa, Italy, at 6118 ft. above sea level.**] *Ann. Sper. agr.* 1950, **4**, 383-91, [English summary, pp. 390-1].

In the high regions of the Alps it is advisable to replace rye and the local wheat, which are slow to mature, with early crops. In 1949 the Alpine experimental station of Salice d'Ulzio carried out small-scale trials with spring-sown wheat varieties on rather loose and shallow soils, with the Italian varieties Ardito, Mentana, and M 33, and the Swedish varieties Blanka, Diamant, Fylgia, Ella and Progress. Results showed that at this high elevation Ardito and Ella do not ripen. The yields per ha. of the other varieties were: Mentana 16 q., M 33 29 q., Blanka 32 q., Diamant 38 q., Fylgia 34 q., and Progress 38 q. The principal observations were that tillering was very limited in this environment and that the larger sized plants gave the greater number of ripe seeds per stem. It is intended to repeat the trials in 1950 on larger plots, employing the seed obtained in the first year.—E.B.

1235 Morozov, P. V. [**Deposition of the embryonic roots in the embryo of hybrid seed of spring wheat.**] [Russian] *Selek. Semenovod.* 1950, **17**, No. 5, 28-35. [Inst. Grain Husbandry, South-East USSR]

In the south-east of USSR, particularly in dry years, the embryonic roots of spring wheat play an important part in providing the plants with water from the lower levels of the soil. Observations on the formation of embryonic roots in the embryo of the grain were made in 1948 with three varieties of spring wheat (Lutescens 62, Erythrospermum 841 and Milturum 553) belonging to different ecotypes and their hybrids of the third generation (Milturum 553 × Lutescens 62, and Erythrospermum 841 × Lutescens 62). Embryonic roots and rudimentary leaves were laid down after formation of the scutellum, the principal organ for conveying food material from the endosperm to the plant organs. Varieties of spring wheat possess hereditary differences according to the degree of differentiation of the rudimentary organs of the plant, particularly of the embryonic roots.—R.P.J.

1236 Šestakov, V. E. [**Winter wheat Petrovskaja 7.**] [Russian] *Selek. Semenovod.* 1950, **17**, No. 7, 73-4.

Petrovskaja 7 is a new wheat variety bred at the Petrovsk State Plant Breeding Station. It has a spindle-shaped, fairly compact ear of medium length and tough straw, resistant to lodging. It is a medium-early variety, maturing at the same time as Uljjanovka. In resistance to drought it surpasses Ržano-wheat hybrid 46/131 and Uljjanovka; in frost resistance it is equal to Ržano-wheat hybrid 46/131 and surpasses Hostianum 237, Odesska 3, Lutescens 108, and Saljum. It is decidedly the most resistant to lodging of all the varieties mentioned. In 1948 Petrovskaja 7 grown at the North Donetz Station, where serious disease was observed, exhibited greater resistance to brown rust (*Puccinia triticina*) and lodging than the standard variety Hostianum 237, and yielded 5.05 centners per ha. more than the latter. At the Karjkov Station it yielded 39.6 centners per ha, or slightly more than the standard variety Hostianum.—R.P.J.

1237 Judanov, I. M. [**Intervarietal crossing as an effective method of increasing yield in wheat.**] [Russian] *Selek. Semenovod.* 1950, **17**, No. 5, 23-8.

Examination of four generations (1945 to 1949) has shown that hybrid seed was throughout superior to seed of the parent forms. Plants originating from hybrid seed exhibited more vigorous and rapid development (earing and tillering occurred 1 to 2 days earlier), greater winterhardiness and drought resistance, and gave a higher yield.—R.P.J.

1238 Clark, J. A. **Registration of improved wheat varieties, 18.** *Agron. J.* 1950, **42**, 408-9.

Five wheat varieties are listed in this registration report. They are the hard red winter wheat Westar, the soft red winter wheats Blackhawk and Austin, the hard red spring wheats Cadet and Saunders and the white wheat Cascade. The development and agronomic and other characteristics of these wheats are outlined.—P.J.B.

1239 Cook, L. J. **Results of replicated trials with wheat varieties 1948-49 and 1949-50.** *J. Dep. Agric. S. Aust.* 1950, **53**, 431-6.

Seven replicated and randomized trials with wheat varieties were carried out by the Department of Agriculture during the 1948-49 and 1949-50 seasons at centres in the principal wheat-growing districts of the State. The trials included several new varieties, not previously tested by the Department, for comparing with older ones suitable for each district. The table accompanying this report shows the average yields per acre, together with percentage yield, compared with Bencubbin (representative of 100 per cent) at each centre. Results from each district are discussed, and yields of individual varieties compared. A list of average valorimeter figures is included to indicate quality of grains produced, as well as lists of recommended varieties for the different districts.—From extract.

1240 THOMAS, I., and WATSON, E. R. **Wheat variety trials on Research Stations.** *J. Dep. Agric. W. Aust.* 1950, **27**, 121-7.

See also *Fld Crop Abstr.* 2, Abs. 115, 116. Results of yield trials indicate that the varieties Celebration and Frisco will not be recommended for growing in the State. Gabo has yielded consistently well at Avondale Research Station but has failed to outyield the standard variety Bungulla at other Research Stations. The yield of Kendee has not been up to expectation. In view of the resistance of Yalta to race 126B of stem rust, and also its yielding ability and generally satisfactory agronomic characteristics, it is now recommended as a rust-resistant, mid-season variety. Wongoondy has continued to yield well under a wide variety of conditions and has yielded better than Bungulla at the Avondale Research Station. An unfavourable characteristic is its property of shedding at maturity. Although the yield of Dowerin is not exceptional, it is resistant to all known races of stem rust in Australia and would be valuable in a rust epidemic. In view of the breakdown of the Eureka-type of resistance to the new race 126B of stem rust, the cross-bred varieties (from Eureka), M88, M89, M90 and M91, will be eliminated from future yield trials.—K.O.

1241 NAUMOVA, N. A. [**The effect of potassic fertilizers in reducing brown rust attack on spring wheat.**] [Russian] *Doklady Vsesojuz. Akad. S.-H. Nauk* 1949, No. 10, pp. 31-3. [All-Union Sci. Res. Inst. Pl. Protection]

Tulun 3A-31 and Lutescens 062 of the varieties susceptible to rust, and Garnet of the resistant varieties respond to potassic manuring by a change in reaction to *Puccinia triticina*. The application of potassium in the form of manure in the tillering phase increases the resistance of these varieties in the earing phase when they are infected with race 20 of brown rust. A marked increase in the resistance of Tulun 3A-31 and Lutescens 062 is noted with a normal dose of potassium. In Garnet greater resistance is observed with a triple dose of potassium.—R.P.J.

1242 UNITED STATES, Department of Agriculture. Circ. No. 814. **New sources of resistance to stem rust and leaf rust in foreign varieties of common wheat.** By *E. S. MacFadden*. 1949, pp. 16.

Of 1639 varieties of wheat tested, 43 varieties of *vulgare* wheat have been selected on the basis of their superior stem rust resistance as compared with the check variety Kota. Data are given of their resistance to stem- and leaf-rust, their glume, spike and kernel lengths and their probable place of origin. The data have been compiled as a guide to breeders wishing to make selections of these varieties for use as parental material in breeding for rust resistance.—P.J.B.

1243 TYLER, L. J., and LOVE, H. H. **Diseases of small grains: dwarf bunt of wheat.** *Cornell Univ. Agric. Expt Sta. 62nd Annual Report* 1949, 172.

Dwarf bunt (*Tilletia caries*) was first observed on winter wheat in New York State in 1949. Seed treatment with chemicals has not controlled the disease, since it appears that the seed-borne spores are not so important in initiating infection as are spores in the soil, though it is considered that seed treatment is an important means for preventing the spread of the pathogen. Field trial results tended to confirm the recommendation that to avoid infection, winter wheat should be sown in New York State at about mid-September, when the soil is still warm, since the bunt spores germinate at a low temperature.—P.J.B.

1244 HOLTON, C. S., BAMBERG, R. H., and WOODWARD, R. W. **Progress in the study of dwarf bunt of winter wheat in the Pacific northwest.** *Phytopathology* 1949, **39**, 986-99, illus.

Dwarf bunt of wheat has been successfully controlled in Utah, southern Idaho, western Montana and central Washington by breeding resistant varieties. Resistant varieties in production are : Relief, Wasatch, Cache, Hymar and Rex. Many resistant hybrids now available for breeding have some value as potential new varieties.—S.D.

1245 SHELLENBERGER, J. A., PHILLIPS, W. M., JOHNSON, J. A., and MILLER, B. S. **The quality of hard red winter wheat as affected by 2,4-D spray applications.** *Cereal Chem.* 1950, **27**, No. 2, 162-6, bibl. 7. [Div. of Cereal Crops and Diseases, U.S. Dept Agric.]

Samples of hard red winter wheat plants were treated with various types of 2,4-D at different rates and different times. The results showed no significant reduction in wheat yield, no significant differences in protein yield and no abnormalities in mineral content, or milling and baking quality.—P.J.B.

1246 UNITED STATES, Department of Agriculture. Tech. Bull. 1004. **Further differentiation of genetic factors in wheat for resistance to the Hessian fly** [*Mayetiola destructor*]. By *C. A. Suneson* and *W. B. Noble*. 1950, pp. 8.

1247 WATSON, I. A., and WATERHOUSE, W. L. **Australian rust studies. VII. Some recent observations on wheat stem rust in Australia.** *Proc. Linn. Soc. N.S.W.* 1949, **74**, 113-31, bibl. 23, pl. 2. [Univ. Sydney]

There are now present in Australia, two races of stem rust; one (race 126) which does not attack the wheat variety Eureka and another (race 126B) similar to it and regarded as a biotype of race 126 which attacks Eureka. Eureka has been crossed with other varieties, e.g. Gabo, in the hope that some of the offspring will be resistant to both races of stem rust. One strain of Kenya, 117A, is resistant to race 15B in the United States as well as to races 126 and 126B in Australia.—K.O.

1248 AMARAL, J. F. DO. Lagarta do trigo. [**Wheat caterpillar** (*Cirphis unipuncta*).] *Biol. São Paulo* 1949, **15**, 209-15, bibl. 3, pl. 2.

Wheat was introduced in the Paranapanema plain to improve the crop rotation on farms not producing coffee. In Sept. 1948 an intense attack of caterpillars occurred on one farm; this was controlled by DDT and BHC, partly distributed from helicopters. In 1949 there was a more extensive outbreak. Experiments were carried out to determine the relative effectiveness of Rhadiatox, Toxaphane, DDT, BHC, arsenical compounds and rotenone. Toxaphane gave much the best results, giving a 100 per cent kill.—N.G.S.

1249 ARGENTINA Ministerio de Agricultura de la Nacion. Division de Inmunologia Vegetal. Inf. No. 11. Informaciones de interes para los trabajos de seleccion de trigos resistentes a sus principalos parasitos. [**Information of interest for the work of selecting wheat resistant to its principal parasites.**] 1949, pp. 5. [Mimeographed]

OATS

1250 BELL, G. D. H. **World cereals today. Oats.** *World Crops* 1949, **1**, 113-6. [School of Agriculture, Cambridge]

This cereal is tolerant of a wide range of soil conditions and can be grown in climates too rigorous for wheat or barley, provided moisture conditions are right. Large concentrations of the crop occur in Europe, USSR and USA. In this article its economic and agricultural significance, in particular in live-stock husbandry, is discussed. —E.B.H.

1251 FREY, K. J., and WATSON, G. I. **Chemical studies on oats. I. Thiamine, niacin, riboflavin, and pantothenic acid.** *Agron. J.* 1950, **42**, 434-6, bibl. 14. [Michigan Agric. Exp. Sta., Lansing]

1252 WOOD, J. G., and SIBLY, Pamela M. **The distribution of zinc in oat plants.** *Aust. J. sci. Res.* 1950, **3**, 14-27, bibl. 12. [Bot. School, Univ. Adelaide]

Oat plants (variety Mulga) were grown in Laffer sand or culture solutions containing varying amounts of added zinc ($ZnSO_4.\ 7H_2O$). Zn contents of living and dead leaves, stems, roots, inflorescence and grain were determined at intervals until final harvest. Throughout the life cycle of the plant Zn was absorbed continuously. Increases in the amount of Zn added to the soil did not result in proportional increases in the amount in the plant—because much of the Zn added was unavailable. When the concentration of Zn was less than 20 ppm. of dry matter at a time prior to exsertion of the inflorescence, symptoms of Zn deficiency appeared on the leaves. Large increases of Zn concentration in the plant did not cause proportionate increases in yield of dry matter or grain. The amount of Zn in the roots increased up to the time of grain development but decreased afterwards and was translocated to other organs.—From authors' summary.

1253 OPSAHL, B. Forsøk med havresortar. [**Oat variety trials (in Norway).**] *Forsk. Forsøk Landbr.* 1950, **1**, 3-34, bibl. 8. [English summary p. 33]. [29th. Report from the State Exp. Sta. Forus]

During the period 1928-48 a number of oat varieties were compared in trials at Forus Experiment Station and on farms in Western Norway. In these trials Svalöf Ørn (Eagle) gave significantly higher yields of grain than most of the other varieties. It has extremely strong straw. Its grain is yellowish-white, somewhat small with a low percentage of hull and a medium hectolitre weight. It ripens rather late. Guldregn II (Golden Rain II) was one of the highest yielding varieties in the trials. Its grain is yellow, of medium size with a low percentage of hull and a high hectolitre weight. It ripens about 3 days earlier than Ørn. Jøtul is the product of a cross made at Forus Experiment Station between Sølvhavre II (Silver Oat II) and a pure line strain of local grey oats. It is especially adapted for green fodder because of its high straw production. It gives heavy crops of grain, which in quality is below medium standard owing to its low hectolitre weight. Merkur is the product of a cross made at Forus between Sølvhavre I and a local strain of grey oats. It ripens about 8 days earlier than Guldregn II. It has a rather weak straw and the quality of its grain is unsatisfactory, the hectolitre weight being too low and the percentage of hull too high. Rygja is a new variety from a cross between Sølvhavre II and Fransk Svarthavre (French Black-hulled oat). It outyielded all other varieties in the trials, and in the Station trials resisted lodging better than all other varieties. It ripens at about the same time as Guldregn II and has grain of fine quality, but the percentage of hull is rather high.—R.P.J.

1254 ÅKERMAN, Å. Svalöfs Blendahavre (01550). [**Svalöf Blenda oat (01550).**] *Sverig. Utsädesfören. Tidskr.* 1950, **60**, 285-9. [English summary, pp. 288-9].

Blenda, a newly-released oat variety, equal in early ripening to Star and Golden Rain II, is a result of a reselection from Sun II. It closely resembles Sun II but ripens 1 to 2 days earlier and is superior to it in yield by 4.2 per cent. In yield it surpasses Star by 4.4 per cent, Golden Rain by 5.8 per cent, and Weibull's Trio by 7.7 per cent. Its grain is of excellent quality, being white, with a faint yellowish tinge, large and plump, with an extremely low percentage of husk. In stiffness of straw it is equal to Eagle, slightly inferior to Sun II, but decidedly superior to all other Swedish oat varieties. Straw yield is low. It is best adapted to light, fertile soils. —R.P.J.

1255 HAGBERT, N. O. Weibulls original Bambuhavre II. [**Weibull's original Bambu Oat II.**] *Weibulls Årsbok* 1950, 6.

Bambu II gives a considerably higher grain yield than the mother variety, Bambu. It was compared with Golden Rain II in sixty-five official trials in Götaland and Svealand and on the average of these gave as high a yield as the latter variety. Bambu II has a white grain of outstanding quality. Its hectolitre-weight and kernel-content are very high. It has exceedingly stiff straw. Because of its high grain yield, excellent quality, earliness and stiffness of straw it is recommended for cultivation throughout the whole of Götaland and Svealand and also in more favourable situations in the southern parts of Norrland.—R.P.J.

1256 ŠEVČENKO, F. P., and KRASILJNIKOVA, V. P. [**Atmospheric warming of seed and its beneficial effect on yield and quality of crop.**] [Russian]. *Selek. Semenovod.* 1950, No. 3, 69-70. [Plant Protection Dept, Inst. Agric., Altai]

Experiments conducted with the Pobeda variety of oats in 1948 and 1949 showed that the effect of atmospheric warming (in the sun) on yielding capacity and quality of seed is not restricted to the year when the process is carried out. The seed progeny of a seed lot subjected to atmospheric warming gave a yield 12 per cent larger than that of the progeny of non-warmed control seed, and showed increased resistance to smut.—R.P.J.

1257 IOWA Agricultural Experiment Station. Res. Bull. 363. **The extent and causes of variability in Clinton oats.** By *D. D. Morey.* 1949, pp. 44.

1258 POEHLMAN, J. M., and KINGSOLVER, C. H. **Disease reaction and agronomic qualities of oat selections from a Columbia × Victoria-Richland cross.** *Agron. J.* 1950, **42**, 498-502, bibl. 22. [Bot. Dept Missouri Univ., Columbia, Mo.]

Twelve of twenty-six oat selections originating from a single F_5 plant from the above cross proved resistant to *Helminthosporium victoriae* and intermediate in reaction to races 1 and 45 of *Puccinia coronata avenae.* This combination of resistance should make the oat selections potentially useful in the southern spring oat areas where *P. coronata avenae* infection is less severe than in the central and northern spring oat areas.—From authors' summary.

1259 SOUTH DAKOTA Agricultural Experiment Station. Bull. 401. **James hulless oats.** By *J. E. Grafins* and *V. A. Dirbs.* 1950, pp. 3.

The bulletin describes this new hulless oat and compares its yield and agronomic characteristics with other standard varieties of oats. It is stiff strawed, mid-early and has given high yields of good quality grain in eastern South Dakota. It is resistant to *Puccinia graminis avenae* (except races 3 and 7) and to *P. coronata* (except race 45). It is also resistant to the smuts, *Ustilago kolleri* and *U. avenae.*—P.J.B.

1260 STANTON, T. R. **Registration of varieties and strains of oats, XV.** *Agron. J.* 1950, **42**, 46-52, bibl. 34. [Bureau of Plant Ind., U.S. Dept Agric.]

Data are given of the agronomic characters of the following improved spring oat varieties. Early yellow: Clinton, Benton and Mindo. Early red: Osage and Neoshi. The Midseason White varieties Bonda and Eaton, and the Midseason Red winter variety Forkedeer.—P.J.B.

1261 STEVENS, N. E., and SCOTT, W. O. **How long will present spring oat varieties last in the central Corn Belt.** *Agron. J.* 1950, **42**, 307-9. [Illinois Agric Expt Sta., Illinois Univ., Urbana]

The paper summarizes the present knowledge of the factors leading to the decline and replacement of oat varieties in the Corn Belt. The value of such studies in furnishing data on which to predict the likely period of economic usefulness of oat varieties is stressed. The principal oat varieties grown in the Corn Belt at present are Clinton (71.3 per cent of the spring oat acreage) and Benton and Mindo (4.2 per cent together). These varieties have been bred from common parents and are susceptible to race 45 and similar races of crown rust. The dangers inherent in the present concentration on one or more related varieties with similar susceptibilities are illustrated by the rise and fall of the Richland and Richland × Victoria derivatives which are susceptible to crown rust races 8 and 10 but are resistant to races 2 and 5. Races 8 and 10 originally were of relatively rare occurrence, but large-scale segregation of the Clinton, Benton and Mindo oat varieties made these two rust races the most prevalent. Another more recent cause of the decline of the Victoria × Richland derivatives has been caused by the inroads of *Helminthosporium victoriae*, a hitherto inconspicuous pathogen. The development of strains of D69 × Bond produced varieties such as Clinton and Benton, resistant to races 8 and 10 of crown rust and *H. victoriae*; these varieties have replaced the Victoria × Richland derivatives. Data are given of the rise and fall in the popularity of oat varieties in Iowa, Illinois, and Indiana. It is tentatively predicted from a study of the available facts that a new oat variety will be needed in the Corn Belt every 4 or 5 years and that a replacement for Clinton should be made ready by not later than 1953.—P.J.B.

1262 UNITED STATES, Department of Agriculture. Fmrs' Bull. No. 1941. **Grow disease-resistant oats.** By *T. R. Stanton* and *F. A. Coffman*. 1949, pp. 13.

1263 IOWA STATE COLLEGE Agricultural Experiment Station. Res. Bull. 370. **Inheritance of resistance to specific races of crown and stem rust, to *Helminthosporium* blight, and of certain agronomic characters of oats.** By *S. C. Litzenberger*. 1949, pp. 453-96.

1264 UNITED STATES, Department of Agriculture. Circ. No. 809. **Mosaics of winter oats and their control in the south-eastern States.** By *H. H. McKinney et al.* 1949, pp. 17.

1265 TESSI, J. L. Presencia de *Pseudomonas coronafaciens* en la Argentina, y reaccion de algunas variedades de avena frente a este parasito. [**The presence of *Pseudomonas coronafaciens* in Argentina, and the reaction of some varieties of oats to this parasite.**] *Rev. Invest. Agric. B. Aires* 1949, **3**, 318-34, bibl. 23, pl. 4.

Pseudomonas coronafaciens was shown to affect oats, wheat (*Triticum durum* and *T. aestivum*), barley, rye, *Bromus catharticus*, *Festuca elatior*, *Hordeum bulbosum*, *H. stenostachys*, *Lolium perenne* and *L. multiflorum*. Trials were conducted to determine the resistance of oat varieties. Results: very resistant varieties; La Estanzuela F2 au 12, D.L. M3., La Previsión 13, and Letoria C.I. 3392. Also resistant; Quincy Red (Quincy 1) C.I. 4077, Lee (Winter oat) C.I. 2042, and Buck Sel 212.—N.G.S.

BARLEY

1266 HUNTER, H. **Quality in malting barley.** *Farming* 1950, **4**, 78-80.

A definition of quality in malting barley and the factors which may influence it.—E.B.H.

1267 MISSOURI Agricultural Experiment Station. Res. Bull. 442. **Agronomic characteristics and disease resistance of winter barleys tested in Missouri, 1943 to 1948.** By *J. M. Poehlman*. 1949, pp. 28, bibl. 14.

The bulletin contains tabulated data of the winter survival, maturity, height, lodging and resistance to *Erysiphe graminis hordei*, *Ustilago nuda*, *U. nigra*, *U. hordei* and *Rhynchosporium secalis* of 249 varieties and strains of barley, including 177 strains from the world collection of the U.S. Dept of Agriculture.—P.J.B.

1268 KODANEV, I. M. [**Fertilizers and their effect on gluten of barley.**] [Russian] *Selek. Semenovod.* 1950, **17**, No. 7, 71-2.

The percentage content of gluten in the grain of barley varies greatly, depending on external conditions, particularly meteorological conditions during the vegetative period, and on the nutritive status of the soil. In years with normal precipitation during the growing period, the content of crude gluten in the barley grain is considerably less than in hot, dry years. In three experimental years, nitrogenous fertilizers caused a sharp rise in the percentage content of gluten in the grain. The effect of potassic fertilizers in this respect was also favourable, though decidedly less marked than that of nitrogen. Practically no increase in the gluten content followed the application of phosphorus. Agricultural measures which promote an increase in the percentage content of protein in the barley grain increase its content of gluten at the same time.—R.P.J.

1269 FREY, K. J., DAVIS, J. F., and HARMER, P. M. **Barley varieties for muck soil.** *Quart. Bull. Mich. Agric. Coll.* 1949, **32**, 196-8. [Michigan Agric. Coll., Expt Sta., East Lansing]

Tests carried out with eight varieties of barley grown on muckland soil showed the superiority of the variety Mars in terms of yield and resistance to lodging. It is a six-rowed, stem-rust resistant variety, with short, stiff straw and a medium to good yield.—P.J.B.

1270 HAYES, H. K. **Barley varieties registered, XI.** *Agron. J.* 1950, **42**, 54, bibl. 2. [Bureau of Plant Ind., U.S. Dept Agric.]

The agronomic characters and yield data are given of the midseason to late, facultative winter barley variety Cascade.—P.J.B.

1271 SEED WORLD. **An outstanding new variety, Harbine barley.** *Seed World* 1950, **67**, 32.

Harbine winter barley originated as a selection of seed sent to Oklahoma Agricultural Experiment Station by the late Dr. H. V. Harlan in 1930. The seed was from a composite cross derived from thirteen varieties. It is also known as Okla. 1004 and Okla. 1-35-216 (C.I. 7524). It is medium early maturing under Oklahoma conditions, six-rowed, with rough awns, and has a short, stiff straw. The heads are erect, the plant tillers profusely, and the kernels are somewhat small. The average yield in 1950 was 40.8 bu. per acre. Its threshed grain is relatively free from awns. It is resistant to five of the eight known races of loose smut.—N.G.S.

1272 TILT, J. **Malting barley—varieties and quality.** *Tasm. J. Agric.* 1950, **21**, 177-83.

The effects of climate, soil preparation and soil fertility on malting quality are discussed. The origin, description and performance in variety trials of the following varieties are given:—Plumage Archer, Golden Archer, Goldthorpe, Beavens 1935, Prior, Research, Abed Kenia, Abed Maja. The variety Beavens 1935, produced grain of equal quality and moderate, but consistent, yield increases compared with Plumage Archer and will be bulked for release. Research, Abed Kenia and Abed Maja have given considerable increases in yield over Plumage Archer but their grain was of inferior malting quality.—From author's summary.

1273 NICHOLSON, G. **What maltsters value.** *Agric. Gaz. N.S.W.* 1950, **61**, 173-6.

A popular article for farmers dealing with the characters of barley samples required by maltsters in New South Wales. As barley in New South Wales is grown as a sideline to wheat, it is essential that the barley crops should mature ahead of the wheat crop. For this reason, early maturing two-row varieties such as Pryor (Chevalier) should be sown. Abyssinian and Trabut are satisfactory six-row varieties but the quantities of this type required by maltsters are limited.—K.O.

1274 BOHMONT, D. W. **De-awning machine for experimental barley samples.** *Agron. J.* 1950, **42**, 311.

1275 RUSSELL, R. C. **A study of the hot water treatment of barley for the control of loose smut, *Ustilago nuda*.** *Sci. Agric.* 1950, **30**, 303-15. [Bot. and Plant Path. Div., Sci. Service, Canada Dept Agric., Ottawa]

Studies are reported of the successive stages in the hot-water treatment. These were undertaken to determine the factors responsible for reduced seed viability following hot-water treatment. Pre-soaking, even for relatively long periods, when not followed by the hot-water treatment caused no appreciable reduction in viability; but when followed by the hot-water treatment for 11 minutes at 126°F., 5 and 10 hours pre-soaking reduced germination by 20 and 59 per cent, respectively. In trials to determine the effect of the temperature of the hot-water treatment on viability, seed damage increased rapidly above 124°F. At 126°F. the germination was 73 per cent; at 120°F. it was 94 per cent. The results of greenhouse and field experiments on the control of *U. nuda* are reported and from them the following routine has been evolved to give satisfactory smut control: pre-soak the seed for 5 hours at 70°F., dip it for 11 minutes in water at 126°F., cool at once with cold water and dry well. Seed-coat damage caused by threshing markedly lowered germination percentages following treatment.—P.J.B.

1276 SCHAFER, L. A., and HANSING, E. D. **Effect of hot-water treatment on emergence of spring barley and control of loose smut.** *Phytopathology* 1950, **40**, 518-21.

1277 RUSSELL, R. C. **The whole embryo method of testing barley for loose smut as a routine test.** *Sci. Agric.* 1950, **30**, 361-6, bibl. 4. [Dominion Plant Path. Lab., Saskatoon, Saskatchewan]

Comparative data giving the percentage of smutted barley seed as determined by growing to maturity and that determined by microscopic examination of the embryo, show that the latter method of testing should prove of value in the routine testing of barley seed.—From author's summary.

1278 ARGENTINA. Ministerio de Agricultura y Ganaderia de la Nacion. Direccion General de Investigationes Agricolas. Division de Inmunologia Vegetal. Inf. No. 12. Informaciones de interes para la seleccion de cebadas resistentes a algunos de sus parasitos mas importantes. [**Information of interest for the selection of barley resistant to some of its most important parasites.**] Buenos Aires, 1949, pp. 4. [Mimeographed]

1279 ARGENTINA. Ministerio de Agricultura y Ganaderia, Direccion General de Investigaciones Agricolas. Publ. Tec. No. 18. Herencia de la resistencia a *Erysiphe graminis hordei* en cebada. II. Estudios con la raza 3 de California. [**Inheritance of the resistance to *Erysiphe graminis hordei* in barley. II. Studies with Californian race No. 3.** By *E. A. Favret.* Buenos Aires, 1949 pp. 14, bibl. 26.

MAIZE

1280 Mjagkov, N. V. [**Cultivation of maize in Pučež.**] [Russian]. *Selek. Semenovod.* 1950, **17**, No. 7, 76-7.

Until comparatively recently maize in the USSR was considered to be suitable for cultivation in the southern provinces only, but of late its cultivation has been extended further north. Industrial sowings are now to be found in the lower and central Volga provinces and in the southern regions of Western Siberia. In the non-black earth zones maize is of great importance as a fodder plant.—R.P.J.

1281 Lawton, K., and Browning, G. M. **The effect of tillage practices on the nutrient content and yield of corn.** *Proc. Soil. Sci. Soc. Amer.* 1948, **13**, 311-7, bibl. 12. [Iowa Agric. Exp. Sta., Ames]

Plant weights increased most on the ploughed plots and least on the sub-surface tilled plots for all soils, except one. On slowly drained soils nutrient deficiencies are likely to be more severe than on permeable soils, and consequently the former respond better to ploughing than to other methods of tillage. The largest increase in plant weight from fertilizers was usually on those plots that had less favourable physical conditions. After the application of fertilizer the percentage of nitrogen in the plant decreased, but the total nitrogen absorbed by the plants increased. The percentage of potassium in the plant was higher on the ploughed plots than for other tillage methods on all soils examined, except two. The yield of corn on these two soils was also less affected by tillage practices than were the yields on other soils. Ploughing, by giving the greatest aeration of the soil generally, produced the best results, more especially where soil conditions were unfavourable and nutrient elements were deficient.—A.D.H.

1282 McCalla, T. M., and Duley, F. L. **Stubble mulch studies : III. Influence of soil micro-organisms and crop residues on the germination, growth and direction of root growth of corn seedlings.** *Proc. Soil Sci. Soc. Amer.* 1949, **14**, 196-9, bibl. 13. [Nebraska Agric. Expt Sta., Lincoln]

Soil mulched with straw and kept excessively wet reduced the germination of maize seed to 44 per cent, as compared with 92 per cent for excessively wet bare soil. Laboratory experiments with soils containing optimum, or less than optimum, moisture content showed no adverse effect on germination from soil mulching. Maize seeds grown on a medium containing a water extract of wheat straw, or of *Melilotus alba*, changed the normal downward direction of root growth in only a few cases, but the *M. alba* extract decreased seedling growth considerably. The addition of 0.5 per cent ammonium nitrate to the wheat straw extract reduced the germination of seedlings, incubated for 24 hr. at room temperature in a plant-residue extract, to 60 per cent, as compared with 83 per cent for wheat straw extract alone and 85 per cent for a control. The germination of seed similarly incubated for 48 hr. was reduced to 25 per cent. A mineral agar medium containing a form of organic nitrogen and soil micro-organisms, stimulated the micro-organisms to produce substances, both gaseous and in solution, that caused the seedling roots of maize seeds, germinated on the medium, to grow upwards and greatly retarded their growth as compared with a control.—P.J.B.

1283 Clore, W. J., and Viets, F. G. **Sweet corn fertility studies on newly irrigated lands in the Yakima valley.** *Proc. Amer. Soc. Hort. Sci.* 1949, **54**, 378-84, bibl. 9. [Irrigation Expt Sta., Prosser, Washington]

The paper presents data of one year's experiments on the effect of manure, ploughed-in winter legumes, various nitrogen applications and plant spacings on the yield of sweet corn on very fine, sandy-loam virgin soil. The highest yields of usable sweet corn (7.15 tons/acre) followed ploughed-in vetches and 160 lb. of N supplement. The use of winter legumes was found much superior to manure; applications of 10 tons of manure per acre resulted in lower yields of usable sweet corn than a good crop of peas or vetch ploughed in. Corn yields were higher after vetches than after peas. Sweet corn yields were substantially increased by applications of N up to the maximum rates and the percentage of barren stalks went down correspondingly. Smaller spacings (6 in.) in the row gave lower yields, smaller ears of usable sweet corn and a higher percentage of barren stalks than did 9 in. spacings. The wider spacings resulted also in a lower percentage of barren stalks.—From authors' summary.

1284 Luetkemeier, O. W., and Kohnke, H. **The influence of supplemental irrigation on corn yields in Indiana.** *Proc. Soil Sci. Soc. Amer.* 1949, **14**, 379-83.

1285 MacGillivray, J. H. **Effect of irrigation on the growth and yield of sweet corn.** *Proc. Amer. Soc. Hort. Sci.* 1949, **54**, 330-8.

1286 Dungan, G. H. **Response of corn [maize] to extremely deep planting.** *Agron. J.* 1950, **42**, 256-7, bibl. 1. [Dept of Agron., Illinois Univ., Urbana]

U.S. Hybrid 13 and open pollinated Navajo Indian maize were sown at depths ranging from 2 to 12 in. The data showed that of the two, the Navajo maize had a far greater capacity for pushing its seedlings to the surface when sown deep. In the case of both varieties, the leaf blades opened underground, but the Navajo blades opened nearer to the ground surface and were able to push their way to ground level from sowings 12 inches deep, unlike the U.S. Hybrid 13, which failed to do so.—P.J.B.

1287 HANSEN, J. R., and BUCHHOLTZ, K. P. **Germination and seedling responses of inbred lines of corn [maize] to 2,4-dichlorophenoxyacetic acid.** *Agron. J.* 1950, **42**, 452-5, bibl. 6. [Wisconsin Agric. Exp. Sta., Madison]

The inbreds demonstrated significant differences in tolerance to 2,4-D, and only a few were resistant. Amongst the more resistant inbreds were W-148, K41, and WF9. Concentrations of 5 and 20 ppm. 2,4-D reduced germination slightly. During germination, the shoot length of some lines was increased, but primary root length in all lines was reduced by 2,4-D. Primary root length is suggested as a measure of tolerance.—N.G.S.

1288 CHAVAN, V. M., KELKAR, S. G., and BIDARI, P. G. **Hybrid maize for the Gokak Canal tract in the State of Bombay.** *Curr. Sci.* 1950, **19**, 156. [Office of Dir. Agric. (Crop Res.) B.S., Poona 5.]

1289 SEN, B. **Hybrid corn for India.** *Indian Fmg* 1949, **10**, 388-90. [Vivekananda Lab., Almora]

The article describes the investigations in India to test whether USA hybrid maize varieties are of value under Indian climatic and soil conditions. Trials in Almora showed that, compared with Almora local, the yields of United States hybrids were unusually high. Compared with the United Provinces strain T_{41}, the yields of the American hybrids Towa 306 and U.S. 13 were 72 and 132 per cent higher, repectively; but the U.S. hybrid Min. 404 gave a lower yield than T_{41}.

More work in breeding is needed to discover and produce in India desirable inbred parent types which can be used for producing the high-yielding hybrids suited to particular Indian regions.—K.O.

1290 FERGUSON, I. A. C. **Hybrid maize. Preliminary disease resistance tests.** *Rhod. agric. J.* 1950, **47**, 229-33.

Three double hybrids, seven inbreds, and one open pollinated variety of maize were tested for resistance to diseases common in Southern Rhodesia. Previous work carried out in the United States on Rhodesian maize is recorded. The techniques evolved for the present tests are detailed. Results are given together with a temperature and rainfall chart for the test period.—Author's summary.

1291 WHALEY, W. G. **The growth of inbred and hybrid maize.** *Growth* 1950, **14**, 123-54, bibl. 16. [Plant Res. Inst., Univ. Texas]

Investigation showed that there was no relation between the size of the embryo and/or size of seed, and the ultimate size of the developed plant. It is considered that the growth factors controlling embryo and seed development differ from the dominating factors in post-germination growth. —N.G.S.

1292 VIETS, F. G., Jr., and DOMINGO, C. E. **Yields and nitrogen content of corn hybrids as affected by nitrogen supply.** *Proc. Soil Sci. Soc. Amer.* 1948, **13**, 303-6, bibl. 7. [U.S. Dept Agric., Washington]

1293 ARKANSAS Agricultural Experiment Station. Rep. Ser. No. 12. **1948 corn performance tests.** By *W. J. Wiser*. 1949, pp. 22.

1294 ARKANSAS Agricultural Experiment Station. Rep. Ser. 14. **1949 hybrid corn yield tests.** By *W. J. Wiser*. 1950, pp. 27.

1295 CONNECTICUT Agricultural Experiment Station. Bull. 518. **Hybrid sweet corn.** By *W. R. Singleton*. 1948, pp. 60, bibl. 21.

The bulletin gives a full summary of work done on hybrid sweet corn at the Connecticut Agricultural Experiment Station over the years 1924 to 1948. The various breeding objectives during this period are reviewed and progress reported.—P.J.B.

1296 ILLINOIS Agricultural Experiment Station. Bull. 536. **1949 Illinois tests of corn hybrids in wide use.** By *J. W. Pendleton* and others. 1950, pp. 467-504.

1297 ILLINOIS Agricultural Experiment Station. Bull. 538. **Experimental corn hybrids tested in 1949.** By *R. W. Jugenheimer* and others. 1950, pp. 527-44.

1298 IOWA STATE COLLEGE Agricultural Experiment Station. Bull. P103. **Iowa corn yield test.** By *J. L. Robinson* and *C. D. Hutchcroft*. 1950, pp. 490-552.

1299 LONNQUIST, J. H. **The effect of selection for combining ability within segregating lines of corn.** *Agron. J.* 1950, **42**, 503-8, bibl. 8.

1300 REEVES, R. G. **The use of teosinte in the improvement of corn [maize] inbreds.** *Agron. J.* 1950, **42**, 248-51, bibl. 4. [Texas Agric. Expt Sta.]

Crossing Texas maize inbred 4R-3 with teosinte (*Euchlaena mexicana*) apparently increased its tolerance to heat, but did not significantly alter its yield in the hybrid combinations studied. Similar crosses with Texas inbred 127C significantly increased the yield in hybrids. The increase seems to be partly due to the increased tolerance to heat and drought endowed by teosinte.—From author's summary.

1301 SUMMERS, E. Como se está aclimatando en Tarma y Huancayo el maíz blanco del Cusco. [**How the white maize of Cuzco adapts itself in Tarma and Huancayo.**] *Informac. SCIPA*. 1947, No. 12, 17-21.
The white maize of Cuzco was widely cultivated under the Incas in Peru but its cultivation is now restricted to the Urubamba valley. Selections were introduced into Tarma and Huancayo. The costings of the cultivation are given.—N.G.S.

1302 ANGULO-BUSQUETS, M. Notas sobre un ensayo de hibridos Americanos de maiz en 1949. [**Notes on a trial of American maize hybrids in 1949.**] *Anal. Est. Exp. Aula Dei* 1950, **2**, 76-97, bibl. 1. [Est. Exp. Aula Dei, Zaragoza]
In comparative trials between 107 U.S. hybrids and eleven Spanish varieties at Zaragoza, eighty of the hybrids gave significantly higher yields. In many cases the yield was increased by 30 per cent or more. The vegetative cycles of the maizes were similar. The American hybrids were more resistant to *Ustilago zeae*, but more susceptible to the European corn borer.—N.G.S.

1303 KERLE, W. D. **Maize sowing recommendations for 1950. Hybrid strains and open-pollinated varieties.** *Agric. Gaz. N.S.W.* 1950, **61**, 399-402.
This season for the first time, hybrid strains are included (together with open-pollinated varieties) in the maize sowing recommendations for various districts issued by the N.S.W. Dep. of Agriculture. Short descriptive notes on the hybrids listed are given.—K.O.

1304 BERGER, K. C., and TRUOG, E. **Response of sweet corn to fertilization with copper and zinc.** *Proc. Soil Sci. Soc. Amer.* 1948, **13**, 372-3, bibl. 5. [Wisconsin Agric. Exp. Sta., Madison]
The yield of usable ears suitable for canning was significantly increased on Miami silt loam both when 5-10 lb. of copper sulphate per acre was included in the fertilizer, and, at a somewhat smaller rate, when 10-20 lb. of zinc sulphate per acre was added. Increases in yield with copper or zinc were not obtained on soil high in organic matter.—A.D.H.

1305 NORTH CAROLINA Agricultural Experiment Station. Bull. No. 366. **Fertilize corn for higher yields.** By *B. A. Krantz*. 1949, pp. 49.

1306 BOTTOMLEY, R. A., CHRISTENSEN, C. M., and GEDDES, W. F. **Grain storage studies. 9. The influence of various temperatures, humidities, and oxygen concentrations on mould growth and biochemical changes in stored yellow corn.** *Cereal Chem.* 1950, **27**, 271-96, bibl. 42. [Minnesota Agric. Expt Sta., St. Paul]
Mould growth and the biochemical properties of No. 1 grade yellow dent corn were affected most by variations in relative humidity and least by changes in atmospheric composition. As the relative humidity of air in contact with the corn increased from 75 to 100 per cent, the total mould count increased logarithmically and the internal mould growth and fat acidity increased sharply; the total and water soluble nitrogen increased slightly, the reducing sugar content increased and the non-reducing sugar content, total dry matter content and viability decreased. The highest mould count occurred at 25°C. and the highest fat acidity at 40°C. Lowering the oxygen concentration of the storage air from 21 to 0.1 per cent decreased the extent of the various changes already quoted; the depression in mould growth was four times that of fat acidity. It was concluded that corn deterioration in storage could not be reliably estimated by measurement of any one of the biochemical changes studied, but the decrease in non-reducing sugar content was the most reliable index, since it bore a straight line relation to the relative humidity of the storage air and to the logarithms of the mould counts for the corresponding corn samples.—From authors' summary.

1307 UNITED STATES, Department of Agriculture. Circ. No. 826. **Storage of dry shelled corn in farm-type bins.** By *L. E. Holman* and others. 1949, pp. 36.
Information is given on: the conditions necessary for the safe storage of shelled maize, the changes in its condition after long storage periods, the temperature of shelled maize in storage, the insect pests of stored maize and their control.—P.J.B.

1308 UNITED STATES, Department of Agriculture. Circ. No. 839. **Mechanical drying of corn on the farm.** By *C. K. Shedd*. 1950, pp. 26.

1309 UNITED STATES, Department of Agriculture. Fmr's Bull. No. 2009. **Storage of small grains and shelled corn [maize] on the farm.** By *C. K. Shedd* and *R. T. Cotton*. 1949, pp. 30.
The bulletin contains information on: the require-

ments for bins and granaries, bin construction, methods of conditioning damp grain, drying by power ventilation using heated air, and the protection of farm-stored grain from insect damage.—P.J.B.

1310 UNITED STATES, Department of Agriculture. Fmr's Bull. No. 2010. **Storage of ear corn on the farm.** By *C. K. Shedd*. 1949, pp. 27.

Information is given of the requirements of maize storage cribs, the different types of crib, crib construction and mechanical drying in cribs.—P.J.B.

1311 BREESE, M. H. **The maize stalk borer.** *Nyasaland Agric. Q. J.* 1949, **8**, 31-36, bibl. 5.

A popular account of the damage caused by, and the control of, the maize stalk borer (*Busseola fusca*). The methods of control advocated are: burning the stubble, trap cropping, cutting and destroying infested parts of the crop, dressing with Derrisol and DDT. The application of insecticides is only effective in preventing the entrance of larvae through the funnel of the plant, and in killing those already in the funnel.—N.G.S.

1312 UNITED STATES, Department of Agriculture. Tech. Bull. No. 983. **Biological control of the European corn borer in the United States.** By *W. A. Baker*, *W. G. Bradley* and *C. A. Clark*. 1949, pp. 185.

1313 CONNECTICUT Agricultural Experiment Station. Bull. 495. **Some fundamental aspects of control of the European corn-borer.** By *N. Turner*. 1945, pp. 43.

1314 BLICKENSTAFF, C. C., FRONK, W. D., and LILLY, J. H. **Watch out for second brood borers.** *Iowa Fm Sci.* 1950, **5**, 19-20. [Iowa State Coll., Ames]

The results are reported of second brood corn [maize] borer control trials, in which different formulations of DDT emulsions were applied by a high-clearance ground sprayer and from an aeroplane. The former was the more effective. Results indicated that a single early treatment of 1.5 lb. of DDT per acre at the stage when egg masses reach an average of 100 per 100 plants, will effectively control the corn borers.—P.J.B.

1315 UNITED STATES, Department of Agriculture. Tech. Bull. No. 987. **Temperature and precipitation in relation to the number of generations of European corn borer in the United States.** By *K. D. Arbuthnot*. 1949, pp. 22.

1316 TORRE, G. R. DE LA. Control de los Gusanos "cogolleros" del maíz. [**Control of the "cogollero" caterpillars of maize.**] *Informac. SCIPA*. 1948, No. 15. 47-48.

In some cases up to 90 per cent of the maize harvest is affected. The caterpillars belong to the genera *Laphygma* and *Xylomiges*. The most important is *Laphygma frugiperda*. Control is obtained by using insecticides based on BHC.—N.G.S.

1317 UNITED STATES, Department of Agriculture, Agricultural Research Administration, Bureau of Entomology and Plant Quarantine. E-804. **Effectiveness of TDE against the Japanese beetle.** By *W. E. Fleming* and *W. W. Maines*. 1950, pp. 8. [Lithoprint]

In preliminary trials, aerial applications of TDE and DDT at a rate of 1 lb. of toxicant per acre, both resulted in a reduction of 90 per cent in the adult *Poppillia japonica* population on maize. In mist-blower application trials on maize, TDE was decidedly inferior to DDT in controlling the beetle. —From authors' summary.

1318 RIPPERTON, J. C., and FUKUNAGA, E. **Chemical control of noxious weeds [in Hawaii].** Univ. Hawaii, Agric. Expt Sta., Report for the Biennium ending June 30, 1948. pp. 33-4.

In field maize trails at Haleakala, 7 lb. of the sodium salt of 2,4-D and 30 lb. of sodium pentachlorphenate per acre, applied in a water solution 4 days after sowing the maize, kept the field clear of seed-borne weeds and grasses for about 2 months, and did not affect the germination, growth or yield of the maize.—P.J.B.

SORGHUM

1319 ELLIOTT, H. G., and WESTON, V. E. **Grain sorghum trials, Denmark Research Station [West Australia].** *J. Dep. Agric. W. Aust.* 1949, **26**, 329-32.

The article presents the results of 1946-49 trials. Where soil moisture supplies are doubtful, Hegarie is more palatable for green food than other grain varieties. It is relatively early, has a moderate but consistent yield, and is of good growth and semi-dwarf habit. A modern American variety, Martin, gives higher yields under more uniform soil conditions, and yields fairly good forage. Wheatland Milo is the only variety commercially available at present. It matures in mid-season and gives a fair yield of grain. Pietersburgh White, though high-yielding, is tall and lank in growth and is late in maturing so that it cannot yet be generally recommended.—K.O.

1320 Patel, M. K., Kamat, M. N., Kulkarni, N. B., and Desai, M. K. **Occurrence of green ear stage in sorghum.** *Curr. Sci.* 1950, **19**, 156-7. [Plant Pathol. Sect., Coll. Agric., Poona]

One of the symptoms of " green ear " on jowar (*Sorghum vulgare*) was the transformation of the spikelets in the panicle into 9 to 42 long, narrow, leafy structures measuring 1-30 × 0.2-2 cm., giving the characteristics of a typical infection by downy mildew. The leafy structures grew from a central, basal point on the floral stalk in the form of a whorl. There was a complete suppression of the development of ovaries and the leafy scales showed brown streaks, containing oospores embedded in mesophyll tissue. Another symptom, on different plants, resulted in transformation of the entire panicle into a form resembling that of green ear of bajri (*Pennisetum typhoideum*), but there was no characteristic whorled appearance and the green scales were much shorter and tubular, measuring 0.2-5 × 0.1 cm. Each proliferated spikelet appeared to retain its individuality in the panicle.—K.O.

1321 Hubbard, J. E., Hall, H. H., and Earle, E. R., **Composition of the component parts of the sorghum kernel.** *Cereal Chem.* 1950, **27**, 415-20, bibl. 16. [North Regional Res. Lab., Peoria, Ill.]

Grain from five sorghum varieties was dissected into endosperm, germ and bran and the proportion of each was determined. The kernel contained about 82 per cent endosperm, 10 per cent germ and 8 per cent bran. All fractions and the whole grain of each variety were analysed for ash, protein, oil and starch. The whole grain was analysed for crude wax by a new method and was found to contain 0.32 per cent of this. The sorghum varieties tested were Westland, Midland, Cody, Pink Kafir and Martin, and data are given of the fractional analyses of the grain from each variety.—From authors' summary.

1322 Texas Agricultural Experiment Station. Bull. 710. **Drying and its effects on the milling characteristics of sorghum grain. Sect. I. Artificial drying.** By *J. W. Sorenson, H. P. Smith, J. P. Hollingsworth, P. T. Montfort* and *F. E. Horan.* **Sect. II. Wet milling.** By *R. A. Anderson* and *R. L. Zipf.* 1949, pp. 44.

RICE

1323 Clowes, H. G. **Rice production and utilization.** *Nature, Lond.* 1950, **166**, 168-70. [Rice Sect., Distribution Div., FAO]

1324 Džulaĭ, A. P. [**Cultivation of rice with periodic irrigation.**] [Russian] *Sovet. Agron.* 1949, **7**, No. 6, 68-79. [All-Union Rice Exp. Sta.]

On experimental evidence it is concluded that the possibilities for obtaining high rice yields are considerably greater with periodic irrigation than with continuous inundation.—R.P.J.

1325 Indian Farming. **Trial of Russian rice in India.** *Indian Fmg* 1950, **11**, 124.

Trials with the Russian rice variety Krasnodar indicated that, although early maturing, its yield and quality are below Indian standards.—N.G.S.

1326 Ramiah, K., and Vachhani, M. V. **Features of rice work in Japan and how they differ from those in India.** *Indian Fmg* 1950, **11**, 54-9, bibl. 4. [Central Rice Res. Inst., Cuttack]

The system of research and extension services in Japan is outlined. A popular account is given of improved cultural and manurial practices.—N.G.S.

1327 Arkansas Agricultural Experiment Station. Rep. Ser. No. 10. **Rice losses during combining. A preliminary report.** By *X. McNeal.* 1948, pp. 4.

1328 Arkansas Agricultural Experiment Station. Rep. Ser. No. 11. **Mechanization of the rice harvest.** By *M. W. Slusher* and *T. Mullins.* 1948, pp. 32.

The bulletin includes comparative data, collected from 145 Arkansas rice farms, of the labour and power requirements and costings of binders and combines used for rice harvesting. The respective merits of both methods of harvesting are discussed. —P.J.B.

1329 World Crops. **Mechanised rice production in British Guiana. The Mahaicony-Abary Rice Development Scheme.** *World Crops* 1950, **2**, 420-2, illus.

The scheme was originated in 1942 under a Board of Control, set up by the British Guiana Rice Marketing Board, with the object of cultivating 5000 ac. as a single unit, and of making machinery available for hire to local farmers. It was found that ploughing in of stubble had an adverse effect upon the drying of fields, so the practice was discontinued. A system of under-water cultivation was evolved, it being found that tractors could effectively harrow and destroy vegetation under water. This resulted in the complete suppression of weeds and red rice, and a more rapid drying of the land at harvest. Seed was drilled or broadcast at the rate of 70 lb. per ac. A 6 in. pipe attached behind the harrows ensured a level seed bed. The local varieties are unsatisfactory for mechanized harvesting, and new types are needed. The grain is harvested either with the J.I. Case tractor-drawn combine with a 6 ft. cut, or with a Massey-Harris self-propelled track-laying combine with a cut of 9-14 ft. The grain is cleaned by means of a Scalperator, a Monitor and a Carter Disc Separator. It is then dried to a moisture content of 18 per cent in a Robinson drier, and passed to a Hess drier for the extraction of the remaining moisture. Costings show that as long as the yield exceeds 16 bags of paddy (143 lb. per bag) it can be grown and milled at a reasonable profit. So far the average yield has only been 14.5 bags per ac.—N.G.S.

1330 LARTER, L. N. H. **Natural cross pollination of wet padi in Malaya.** *Malay. agric. J.* 1950, **33**, 82-8.

1331 AIYAR, S. P. **Straw manuring in relation to *amyitpo* disease of rice.** *Proc. Indian Acad. Sci.* 1950, **31**, 181-92, 3 pl. bibl. 19, illus.

A nutritional disorder of rice, known locally as *amyitpo* (lit. root disease) was observed in Patheingyi near Mandalay [Burma] in 1938. It was found to be due to potassium deficiency, caused partly by ionic antagonism, but mainly by the assimilation of available potassium by soil micro-organisms. It is concluded that straw manuring is definitely harmful to the rice crop in Patheingyi soil, as it gives rise to *amyitpo* as a result of induced potassium deficiency. It is recommended that rice stubble be burnt off, and that potassium sulphate be applied.—N.G.S.

1332 INDIAN FARMING. **Investigation of blast and foot-rot diseases of rice in Madras Province.** *Indian Fmg* 1949, **10**, 546.

Of the large number of selections tested over the past six seasons at Coimbatore, thirty-five long duration rices showed a high degree of resistance to blast (*Piricularia oryzae*). Two selections, Co. 25 and Co. 26, have been found suitable for cultivation in the Tanjore, Tiruchirapalli and Mathurai districts. Application of excessive doses of ammonium sulphate or of groundnut cake increased the incidence of blast in susceptible varieties. Two strains of rice, G.E.B. 24 and Ptb. 7, were highly resistant to infection with foot rot (*Fusarium moniliforme*). Seed treatment with the organo-mercuric compounds Ceresan and Agrosan G.N. reduced the incidence of infection with foot rot to 0 to 0.4 per cent.—K.O.

1333 MALAGVTI, G. Algunas notas sobre las enfermedades del arroz. [**Some notes on diseases of rice.**] *Agric. Venez.* 1950, **14**, 44-6, illus.

1334 NAUNDORF, G., and VILLAMIL, F. G. Poder selectivo del 2,4-D. Contribución a la lucha contra el arroz rojo. Segunda nota. Ensayos comparativos con el ácido 2,4-dicloro-fenoxiacetico y su sal sodica. [**Selective power of 2,4-D. Contribution to the control of red rice. Second note. Comparative trials with 2,4-dichlorophenoxyacetic acid and its sodium salt.**] *Notas agron. Colombia,* 1950, **3**, 91-6, bibl. 1, [English summary, p. 96].

The free acid has proved more effective than the sodium salt in inhibiting germination of red rice (*Oryza rufipogon*). More than double the quantity of the sodium salt is required to obtain the same effect as with the acid. For effective control the dose is 4 mg. of 2,4-D acid per kg. of soil. The white rice of the variety " Palmira 105," sown one week after soil treatment, developed normally. Mixtures of 2,4-D and other auxins, which are under trial, appear to be more effective than the acid used alone.—E.B.

MILLET

1335 CARVALHO, T. de. O mildio do milho. (*Sclerospora* sp.) [**Mildew of millet.** (*Sclerospora* **sp.**).] *Gaz. Agric. Mozambique* 1949, **1**, 61-3, bibl. 2, illus.

Control measures advocated are: early sowing, sound rotation practice, seed disinfection and the selection of resistant varieties.—N.G.S.

1336 CARVALHO, T. de. A *Striga lutea* Lour. Erva parasita do milho e de outras gramíneas—Como combatê-la. [***Striga lutea* Lour. Parasitic weed of millet and other Gramineae. How to fight it.**] *Gaz. Agric. Mozambique* 1949, **1**, 5-11, bibl. 6, illus.

This weed is very common in Mozambique. Methods of combating it include: trap-cropping, sound rotations, early sowing, and weeding. Weeding may be by hand or by chemical means. Fernoxone is expensive, but gives control. Other products of 2,4-D based on amino acids and esters, such as Weedone, are understood to give better results.—N.G.S.

LEGUMES

MISCELLANEOUS

1337 PARHAM, B. E. V. **List of introduced leguminous plants recorded in Fiji.** *Agric. J. Fiji* 1949, **20**, 21-6.

1338 ARMSTRONG, G. M., and ARMSTRONG, J. K. **Biological races of the *Fusarium* causing wilt of cowpeas and soybeans.** *Phytopathology* 1950, **40**, 181-93. [South Carolina Agric. Expt. Sta., Clemson]

Details are given of the susceptibility of a number of varieties of soybean and cowpea (*Vigna sinensis*) to *Fusarium* wilt. These indicate that there are two, and probably more, biological races of the *Fusarium* wilt on the basis of pathogenicity. Several samples of cowpea seed were observed to carry *Fusarium* wilt, which was not eliminated by sodium hypochlorite treatment.—P.J.B.

1339 INDIAN FARMING. **The red hairy caterpillar and its control.** *Indian Fmg* 1949, **10**, 522-4.

This pest, *Amsacta moorei* or *A. albistriga*, does most damage to the leafy portions of the infested crops, mainly kharif crops, of pulses and legumes. Control measures are described.—K.O.

1340 CAPOOR, S. P., and VARMA, P. M. **A new virus disease of *Dolichos lablab*.** *Curr. Sci.* 1950, **19**, 248-9, bibl. 2, illus. [Coll. Agric., Poona]

1341 RAYCHAUDHURI, S. P., and PATHANIAN, P. S. **A mosaic disease of *Crotalaria mucronata* Desv. (*C. striata* DC.)** *Curr. Sci.* 1950, **19**, 213, bibl. 5, illus. [Div. Mycol. Pl. Pathol., Indian Agric. Res. Inst., New Delhi]

1342 WARK, D. C. **The susceptibility of peas to four diseases occurring naturally in the Australian Capital Territory.** *J. Aust. Inst. agric. Sci.* 1950, **16**, 32-3, bibl. 1. [C.S.I.R.O. Canberra]

From observations of natural infection and from inoculation of leaflets floating on a 10 per cent sucrose solution it was observed that young leaves of all the varieties and species of *Pisum* were resistant to *Erysiphe polygoni* (powdery mildew) but that mature leaves were susceptible. Six varieties reported to be immune to powdery mildew in Peru were as susceptible as other varieties when grown in Canberra. All species of *Lathyrus* tested were more susceptible than the garden pea. With infections produced by spray inoculations of *Ascochyta* blight (*A. pisi*) seedlings of any variety were more resistant than older plants of the same variety, late-maturing varieties being less susceptible to the disease than earlier varieties. Field and greenhouse tests showed all varieties of *Pisum* spp. to be susceptible to *Mycosphaerella* blight (*M. pinodes*) and *Lathyrus hirsutus* was the only species of *Lathyrus* to remain free from symptoms in the field, though it was readily infected by spray inoculations. No species or variety tested was immune to bacterial blight (*Pseudomonas pisi*) though differences occurred in the number and size of lesions on different varieties. The edible podded pea varieties had the least extensive lesions.—K.O.

1343 MCKNIGHT, T. **Efficiency of isolates of *Rhizobium* in the cowpea (*Vigna unguiculata*) group, with proposed additions to this group.** *Qd J. agric. Sci.* 1949, **6**, 61-76, bibl. 8.

1344 ŠEVČUK, T. N. [**Re-establish and propagate local varieties of lentils.**] [Russian] *Selek. Semenovod.* 1950, **17**, No. 8, 51-5. [All Union Inst. Plant Industry]

Measures should be taken to preserve local, high-yielding varieties of lentils. All seed of the local varieties Inzavinsk, Petrovsk and Mučkapsk should be used for sowing only; its use for food should be prohibited. Experiments are needed to determine the best seed production technique and the most suitable agricultural methods for obtaining high and stable yields.—R.P.J.

1345 VIDALON, C. G., SCHRŒDER, R. A., and ALBRECHT, W. A. **Carbohydrate-protein ratio of peas in relation to fertilization with potassium, calcium, and nitrogen.** *Proc. Soil Sci. Soc. Amer.* 1948, **13**, 352-7, bibl. 13. [Missouri Agric. Exp. Sta., Columbia]

Pea plants grown for seed production under variable amounts of the soil's exchangeable potassium, calcium, and nitrogen demonstrated the influences by these soil treatments not only on the vegetative growth but also on the carbohydrate-protein content of the pea seeds. It was clearly evident that the balance of these three nutrients was the important factor in control. The effect of increments of any one of the nutrients was dependent on the amounts present of the others. These facts held for the production of the vegetative bulk, for the total seed produced, and for the carbohydrate-protein ratio of those seeds.—Authors' summary.

BEANS

1346 CORNELL UNIVERSITY Agricultural Experiment Station. Mem. 293. **Toxicity of 2,4-D in respect to the carbohydrate level of red kidney bean seedlings.** By *G. E. Davis* and *O. Smith*. 1950, pp. 20.

Darkening or shading 2,4-D-treated red kidney bean leaves reduced the toxicity of 2,4-D. Applications of 2,4-D to intact leaves had almost no effect on plants held in darkness for 36 hours, due to their very low carbohydrate content. The absence of toxic symptoms in 2,4-D treated shaded plants, reported previously, was considered to be due to the failure to absorb and/or translocate 2,4-D. Instances where shaded plants were killed rapidly indicated that the physiological condition of the plants was such that 2,4-D was absorbed and translocated, its toxicity being high when associated with a low carbohydrate content in the plants. The respiration of starved plants was stimulated by applications of 2,4-D. This fact, together with the manner of death resulting in plants treated through slivers of hypocotyl, suggested that 2,4-D is basically a protoplasmic toxin ; all other toxic symptoms are manifestations of the complex metabolic processes arising from such toxicity.—From authors' summary.

1347 Yarwood, C. E. **Effect of temperature on the fungicidal action of sulphur.** *Phytopathology* 1950, **40**, 173-80. [Plant Path. Div., California Univ., Berkeley]

Leaf discs bearing a dried deposit of lime sulphur were placed on the surface of bean leaves inoculated with *Erysiphe polygoni*. The discs were later removed and it was seen that the *Erysiphe* growth was inhibited for varying distances beyond the area over which the disc was placed, the distances increasing as the time of exposure to the lime sulphur increased. A direct relationship was also seen to exist between the extent of the area of the *Erysiphe* inhibition zone and the temperature at the time of exposure ; the higher the temperature, the greater the area of mildew inhibition over a given period of time. Separation of the lime sulphur discs from the inoculated leaf by means of a cheese cloth screen showed that the inhibition effect of the lime sulphur was independent of actual sulphur contact with the *Erysiphe*. Bean leaves inoculated with *Uromyces phaseoli* were exposed to H_2S vapour. The results obtained were fragmentary, but indicated that the relationship between temperature and the fungicidal action of H_2S was not significantly different from the temperature-time relationship described above for *Erysiphe*.—P.J.B.

1348 El-Helaly, A. F. **Bordeaux mixture for the prevention of rust and chocolate spot in beans.** *Phytopathology* 1950, **40**, 699-701, bibl. 2. [Farouk I Univ., Alexandria, Egypt]

Trials carried out in Egypt to determine the economic and practical possibilities of using Bordeaux mixture for controlling chocolate spot (*Botrytis fabae*) and rust (*Uromyces fabae*) on beans, showed that 0.25 per cent Bordeaux mixture is a practical success in controlling both diseases. A small 1.5 h.p. hydraulic type pump sprayer was found most suitable since it could be readily transported in the field. Data are given comparing rust and chocolate spot infection, yields and net profit from unsprayed and sprayed bean crops.—P.J.B.

1349 Norton, L. B., and Dewey, J. E. **Synthetic materials as insecticides.** Cornell Univ. Agric. Expt Sta., 62nd. Annual Report 1949, 144-5.

Laboratory studies on the control of the Mexican bean beetle (*Epilachna corrupta*) with Parathion, the anysil analogue of DDT, DDT, Toxaphene and BHC, showed that only Parathion, at applications of not less than 1 lb. of 15 per cent wettable powder per acre in very moist conditions, was toxic to *E. corrupta*. Parathion was the only toxicant with observable ovicidal action which gave a complete kill in 24 hr.—P.J.B.

1350 Schuster, M. L. **A genetic study of halo blight reaction in *Phaseolus vulgaris*.** *Phytopathology* 1950, **40**, 604-12.

1351 United States, Department of Agriculture. Fmrs' Bull. No. 1692. **Bean diseases and their control.** By *W. J. Zaumeyer* and *H. R. Thomas*. 1949, pp. 38.

1352 Wade, G. C. **Diseases of broad beans and tick beans [in Tasmania.]** *Tasm. J. Agric.* 1950, **21**, 28-32, bibl. 1.

The article discusses the symptoms, cause and control of three diseases of broad and tick beans, namely, *Ascochyta* leaf spot, rust and mosaic.—K.O.

1353 Wilson, R. D. **Molybdenum in relation to the scald disease of beans.** *Aust. J. Sci.* 1949, **11**, 209-11, bibl. 11. [N.S.W. Dept Agric., Sydney]

The article reviews the literature on the subject. Combined with the evidence regarding the association between seed origin and scald, the responses of scald-affected plants to molybdenum would suggest that scald disease of beans is a molybdenum deficiency disease and that only when the supply of molybdenum from both seed and the soil is inadequate do plants show symptoms of this disease. Anderson (see *Herb. Abstr.* 19, Abs. 780 and 1187) has stated that all responses of legumes to molybdenum previously reported in Australia could be ascribed to an increase in symbiotic nitrogen-fixation. The responses of scald-affected bean plants to molybdenum are apparently due to a direct effect of the molybdenum on the physiology of the bean plant.—K.O.

LUPIN

1354 Brown, R. T., and Potter, G. F. **Effects of fertilizers applied to cover crops on cover crop yield, on tung trees and on the yield and oil content of tung fruit.** *Proc. Amer. Soc. Hort. Sci.* 1950, **54**, 53-6, bibl. 2. [U.S. Dept Agric., Bogalusa, La]

Trials were conducted to determine the effect of applications of nitrogen, potassium, dolomitic limestone and manganese sulphate on the yield of lupin grown for green manure on Irvington fine sandy loam. Under the conditions of the trials, only potassium consistently raised the yield of lupin; the average yield per acre per year in terms of dry matter for applications of 24 lb. of K_2O per acre being 3.47 tons, or 1.61 tons more than from plots receiving no potassium.—P.J.B.

1355 Florida Agricultural Experiment Station. Press Bull. 650. **Curing and storing lupine seed.** By *P. Decker et al.* 1948, pp. 4.

SOYBEANS

1356 Håstadius, N. Sojabönodlingen i Sverige—en framtidsfråga. [**Soybean cultivation in Sweden—a future question.**] *Svensk Frötidn.* 1950, **19**, 113-6.

Impressions from a study of soybean cultivation in USA are recorded. In trials in Sweden the soybean has proved to be a light-soil plant. The areas most suitable for its cultivation would be: certain districts in the province of Kalmar; on Öland and Gotland; the region around Kristianstad and the coast tracts in south-west Scania.—R.P.J.

1357 Munn, A. H. **Production and utilization of the soybean in the United States.** *Econ. Geogr.* 1950, **26**, 223-34.

1358 Prunty, M. C., Jr. **Soybeans in the Lower Mississippi Valley.** *Econ. Geogr.* 1950, **26**, 301-14. [Geog. and Geol. Dept, Georgia Univ., Ga]

A review of the development and changes in soybean production over the last 20 years and an account of trends since 1944, with particular reference to their effect on cotton production in the area.—P.J.B.

1359 Porterfield, J. G. **Soybean harvesting losses.** *Soybean Digest* 1950, **10**, No. 11, 46-7. [Iowa State Coll.]

1360 Holman, L. E. **What is good soybean storage?** *Soybean Digest* 1950, **10**, No. 11, 44-5. [Bureau Plant Ind., U.S. Dept Agric.]

1361 United States, Department of Agriculture. Bureau of Agricultural and Industrial Chemistry. **AIC-234. Oriental methods of using soybeans as food with special attention to fermented products.** By *A. K. Smith.* 1949, pp. 40. [Mimeographed]

1362 Andersson, G. Svalöfs Ugra soja. [**Svalöfs Ugra soja.**] *Sverig. Utsädesför. Tidskr.* 1950, **60**, 230-33, [English summary].

Glycine max has not been grown on a commercial scale in Sweden because of the lateness of the foreign varieties and their low yield under Swedish conditions. As an oil-producing plant the soybean will probably never be able to compete in Sweden with such plants as rape, oil turnip, white mustard, etc., but its large content of high quality proteins must be considered. Svalöf's Ugra soybean is a new variety obtained from a cross between a black-seeded American variety, Wisconsin, and a brown-seeded Polish variety, Brunatna Vilenska. In eighteen trials the new variety outyielded Vilnensis, one of the best of the imported varieties, by 43 per cent (Vilnensis 839 kg. per ha., Ugra 1201 kg.). In twelve trials for time of ripening Ugra was on the average 10 days earlier than Vilnensis (Vilnensis 141 days from sowing to harvest, Ugra 131). The percentage of fat on a dry matter basis was 17.6 in Ugra compared with 15.7 in Vilnensis. The plants of Ugra are of medium height with limited top growth. The seed is brown and somewhat smaller than in Vilnensis. The 1000-grain weight of Ugra in the material so far available was 127 grm. Ugra is much more resistant than Vilnensis to the virus diseases common in Sweden.—R.P.J.

1363 United States, Department of Agriculture. Fmrs' Bull. No. 1520. **Soybeans; culture and varieties.** By *W. J. Morse, J. L. Cartter* and *L. F. Williams.* 1949, pp. 38.

The bulletin contains a detailed description of the agronomic characters of nearly 150 soybean varieties. They are listed according to regional adaptation and their uses. The practical aspects of soybean culture are reviewed in detail, including the place of soybeans in rotations and their use in mixtures with other forage crops. The insect pests of soybeans are listed and control measures outlined.—P.J.B.

1364 Arkansas Agricultural Experiment Station. Bull. 490. **Soybean research in Arkansas, 1936-48. Varietal tests for seed and hay and studies in disease control.** By *C. K. McClelland* and *E. M. Cralley.* 1950, pp. 62.

The hay and seed yield and other agronomic data of soybean varieties tested at ten places in Arkansas from 1936 to 1948 and data of the chemical composition of the seed from seven of these places during the last 6 years of this period, are presented.

The results of seed treatment tests for the control of seedling diseases and observations on leaf diseases are included.—From authors' summary.

1365 OKLAHOMA Agricultural Experiment Station. Bull. No. B-356. **Soybean variety tests, 1926 to 1949.** By *C. L. Canode* and *J. E. Webster*. 1950, pp. 20.

1366 HILDEBRAND, A. A., and KOCH, L. W. **Observations on six years' seed treatment of soybeans in Ontario.** *Sci. Agric.* 1950, **30**, 112-18, bibl. 11. [Dominion Plant Path. Lab., Harrow, Ont.]

Studies on the yield of soybeans treated with six different seed protectants showed that only in one case where extremely poor seed (40 per cent visibly diseased, germinating capacity 23.4 per cent) was treated with Spergon (tetrachloro-para-benzoquinone) did the treatment lead to increased emergence and yield. Rainfall, temperature and yield data given in the test show the far greater effect of rainfall, and its distribution over the growing season, on yields. Results showed that though seed treatment might lead to an increased stand of plants, yields remained substantially unaffected. This work confirms earlier views which held that where good quality soybean seed of high germination is sown, seed treatment is of doubtful value.—P.J.B.

1367 WELCH, C. D., HALL, N.S., and NELSON, W. L. **Utilization of fertilizer and soil phosphorus by soybeans.** *Proc. Soil Sci. Soc. Amer.* 1949, **14**, 231-5, bibl. 7.

1368 CARLYLE, R. E. **Use of chemicals in weed control and harvest drying of soybeans.** *Soybean Digest* 1950, **10**, No. 11, 38-9. [Monsanto Chemical Co., St. Louis, Mo.]

Pre-emergence treatment with various chemical herbicides showed that only sodium pentachlorophenol was effective. By spraying pentachlorophenol oil concentrate from the air, the effect of a rather severe early frost can be obtained so that the soybean crop is dried up, thus making combine harvesting simpler and more effective.—N.G.S.

1369 BOOCK, O. J. O Dowfume W-10 no combate aos nematóides que parasitam as plantas de soja. [**Dowfume W-10 in the fight against the parasitic nematodes of soybean.**] *Rev. Agric. Piracicaba* 1950, **25**, 297-304, bibl. 7, illus.

Dowfume W-10 was tested for its control of the nematode *Heterodera marioni* on soybeans [*Glycine max*]. Soil injections, at a rate of 30 gallons per acre, at distances of 20 cm. × 20 cm., gave effective control. Dowfume W-10 had no noxious effect on nitrogen fixating bacteria.—N.G.S.

1370 BOOSALIS, M. G. **Studies on the parasitism of *Rhizoctonia solani* Kuehn on soybeans.** *Phytopathology* 1950, **40**, 820-31, bibl. 13, illus.

Investigation was made of the effect of various proprietary seed dressings in controlling damping-off of soybeans. All treatments, except Fermate, more than doubled seedling emergence. The best control of the race of *Rhizoctonia* tested (isolate No. 1) was obtained with Spergon, Ceresan M, and New Improved Ceresan.—N.G.S.

ROOT CROPS

MISCELLANEOUS

1371 BORGSTRÖM, G. Av Jordbrukets forskningsråd utförd lagringsforskning. Redogörelse för lagringsforskningskommitténs verksamhet 1945/46-1948/49. [**Report on the research activities of the Storage Committee of the Agricultural Research Council 1 July 1945-30 June, 1949 (in Sweden).**] *K. LantbrAkad. Tidskr* 1950, **89**, 153-180, [English summary, p. 178]. bibl. 56.

Varietal differences in the keeping quality of various strains of fodder beet are being established. Each year a quality survey has been made on combine-harvested grain. The effect of a short heat treatment was studied, as well as the possibility of using simple ventilation-drying on the farm to assist the work of the central grain stores.—R.P.J.

1372 AGRICULTURAL GAZETTE OF NEW SOUTH WALES. **The beet web-worm *(Hymenia recurvalis)*.** *Agric. Gaz. N.S.W.* 1950, **61**, 256.

Among the plants attacked by this caterpillar are silver beet, beetroot, saltbush, *Portulaca*, *Amaranthus*, and *Chenopodium*. Infestation can be reduced by destroying all infested weeds near to beet crops. An application of 50 lb. per acre of a derris-talc mixture (1 lb. derris powder to 8 lb. talc) has been effective in destroying the caterpillars when applied direct to the under-surfaces of leaves and to the hearts of the plants. Lead arsenate and DDT dusts or sprays may be used on young plants, but must not be used on older plants which are used for food. —K.O.

1373 Dunning, R. A., and Jones, F. G. W. **Mangold fly: its life-history and control.** *Brit. Sug. Beet Rev.* 1950, **18**, 153-7. [School Agric., Cambridge]

Cultural control of the mangold fly (*Pegomyia betæ*) can be obtained by: early drilling, delayed gapping or singling, top-dressing with nitrogenous fertilizer. Effective chemical controls are: spraying with a 0.125 per cent DDT emulsion at the rate of 50-75 gal. per ac. when more than thirty eggs per plant appear at the 6-8 leaf stage; the application of 0.5 cwt. per ac. of 5 per cent DDT dust. Treatment must begin as soon as possible after the mines appear. With a spray, a top cover is sufficient; but with a dust a more complete cover is essential.—E.B.H

SUGAR BEET

1374 Garner, H. V. **Sugar beet irrigation, results of 3-year experiments.** *Brit. Sug. Beet Rev.* 1950, **18**, 145-9.

No practical recommendations can be based on the results of the 3 years' experiments organised by Rothamsted Experimental Station during 1947-9 and carried out at Kesgrave and Milford, Surrey. Beet responded well to watering in very dry summers, but 6-7 in. was sufficient. Under normal rainfall conditions no watering was required. Varying quality-effects were observed, the sugar content being greatly depressed at Milford, in 1947, but considerably improved at Kesgrave in 1949, by irrigation. There were appreciable reductions in noxious nitrogen at both centres in 1949. With a basal dressing containing about 2 cwt. sulphate of ammonia there was no appreciable response to further nitrogen, which in some instances proved harmful in the presence of water. Further research is required.—E.B.H.

1375 Donà dalle Rose, A. Perfezionamento della tecnica bieticola e riduzione dei costi di produzione. [**Improvement in methods of sugar beet cultivation and reduction of production costs.**] *Humus, Milan* 1950, **6**, No. 4, 11-3. [Exp. Sta. for Beet Cultivation, Rovigo, Italy]

Reduction of costs in Italy is handicapped by a surplus of labour which makes it inadvisable to develop mechanization. However, cultivation methods can be improved as regards seed disinfection (with organic mercury compounds and by biological means), seed-bed preparation, soil condition, etc.—E.B.

1376 Mirchandani, R. T. **Sugar beet trials in Sind.** *Indian J. agric. Sci.* 1948, **28**, 25-31, bibl. 9. [Received 1950] [Dept Agric. Sind, Karachi]

Investigation showed that sugar beet can profitably be grown between October and March in Sind. The plots were irrigated, and the crop earthed up when 2 months old. When sown at the end of September and in October, and harvested during March and April, an average yield of 11 tons per ac. with 14.3 per cent sucrose content, was obtained. The crop is ready for harvesting after 5.5 months, but must be cleared before May, or the roots will rot.—N.G.S.

1377 Gaskill, J. O. **Drying after harvest increases storage decay of sugar beet roots.** *Phytopathology* 1950, **40**, 483-6. [Colorado Agric. Expt Sta. Fort Collins]

Beet storage for 3 or 4 months before processing is necessary in many parts of the U.S.A. The beets thus stored are subject to sugar losses through respiration processes, but under some conditions, invasions by pathogens, particularly *Phoma* spp., may lead to far greater losses through rotting. Experiments were carried out on the storage of beets washed and dried out of doors for periods of 0.5 hr. and 1, 2 and 4 days. The beets so dried were divided into two lots, one stored for 3 months at 65°F., and the other stored for 4 months at 45°F. In both cases results showed a marked graduation in rotting losses, from the unwilted beets (dried 0.5 hr.) which showed very little storage rot, to the very severe rotting in beets that had lost 15.4 per cent of their weight over 4 days pre-storage drying. The results emphasize the need for prompt removal of beets from the field and strengthen the arguments in favour of mechanical harvesting.—P.J.B.

1378 Michigan Agricultural Experiment Station. Circ. Bull. 215. **Reducing sugar beet costs.** By *C. E. Johnson* and *K. T. Wright.* 1949, pp. 31.

1379 Leonard, C. D., and Toth, S. J. **Plant studies with radioactive sodium.** *Agron. J.* 1950, **42**, 469-74, bibl. 9. [New Jersey Agric. Expt Sta., Rutgers Univ., N.J.]

Preliminary studies on alfalfa showed that an application at a rate of 0.5 microcurie per container [size not stated] of substrates was sufficient for the detection of Na^{22} in plant tissue. In studies on the absorption of Na^{22} by sugar beets at various soil depths in the presence of nitrogen fertilizers, it was shown that sugar beets obtained most of their Na from a 6 in. soil depth; in the case of sugar beet fertilized with calcium nitrate, Na absorption was approximately equal from both the 6 in. and 18 in. soil depths.—P.J.B.

1380 Minnesota Agricultural Experiment Station. Tech. Bull. 183. **Influence of fertilizers on composition and quality of sugar beets.** By *L. E. Dunn* and *C. O. Rost.* 1949, pp. 11.

1381 Skuderna, A. W. **What is the practical spacing pattern for sugar beets grown in the Red River Valley, Minnesota area?** *Proc. Amer. Soc. Sug. Beet Technol.* 1948, 271-5, bibl. 2. [American Crystal Sugar Co., Rocky Ford, Colo]

Trials conducted over 9 years in the Red River Valley of Minnesota, on non-irrigated sugar beet grown under an average annual rainfall of 20 in. have shown that cross-blocking and cross-cultivating give greater yields of roots than hand-blocking; blocks 3 to 4.5 in. in width were used, and all were hand-thinned. The most productive arrangement of the plants is one approaching planting on the square, and preliminary tests in 1947 gave satisfactory yields with row widths of 20 and 22 in. and three 16 in. and five 14 in. spacings between beets in the row to accommodate tractor wheels in cross-cultivating.—G.K.G.C.

1382 Tingley, R. J. **Recent experimental results of row spacings and field population of sugar beets.** *Proc. Amer. Soc. Sug. Beet Technol.* 1948, 287-9. [Holly Sugar Corporation, California]

In irrigated sugar beet trials, no advantage was gained by reducing the spacing below 10 in. within the row, row width being constant at 30 in.—G.K.G.C.

1383 Brewbaker, H. E. **Single-germ beet seed a commercial possibility.** *Through the Leaves* 1950, **38**, No. 4, 29-31, illus. [Longmont Expt Sta.]

Five single-germ plants were found in fields grown from commercial seed in Oregon in 1948. Two of these plants produced progeny of similar character. By crossing these with normal multi-seeded types it is hoped to produce a commercially acceptable single-seed sugar beet.—N.G.S.

1384 Tuščenko, A. V. [**Agrobiological service—in seed production of sugar beet.**] [Russian] *Selek. Semenovod.* 1950, **17**, No. 4, 15-8.

The measures needed to improve the yield and quality of sugar-beet seed are indicated. A high average weight per root in the mother beets is a powerful factor in increasing the yield of seed and in improving its quality.—R.P.J.

1385 Farm Implement and Machinery Review. **Next steps in sugar beet mechanisation.** *Fm Impl. Mach. Rev.* 1950, **76**, 103-5.

1386 Orleans, L. P., and Cotton, R. H. **Reduction of storage losses in beets by ventilation.** *Proc. Amer. Soc. Hort. Sci.* 1949, **54**, 319-24, bibl. 8. [Holly Sugar Corp., Colorado Springs, Colo]

Two 2600-ton piles of sugar beet were used to compare sugar beet storage losses in a check unventilated pile and a pile ventilated by duct blowers set to operate at all air temperatures 2°F. below the beet temperatures, down to 27°F. The average temperatures of the two piles during the period of storage are given in graph form and show that the ventilated pile temperature dropped more rapidly initially than the check pile and also warmed up more slowly in October during a period of high air temperatures. After 85 days' storage the two piles were processed and data of 50 comparative samples for sugar content and purity given. The ventilated pile gave 339.4 tons of sugar compared with 326.4 tons for the check pile; purities were 80.2 and 78.7 respectively. Detailed costings showed that the costs of ventilation were 20 cents per ton and gross savings 70 cents per ton.—P.J.B.

1387 Afanasiev, M. M., and Morris, H. E. **Effect of fertilization on the recovery of transplanted sugar-beet seedlings affected with *Aphanomyces cochlioides* Drechs. in the greenhouse.** *Phytopathology* 1949, **39**, 1001-4, bibl. 7. [Dept Expt Sta., Bozeman]

One-month-old diseased sugar-beet seedlings grown in the greenhouse and transplanted to soil flats fertilized with various combinations of nitrogen, phosphorus, potassium, and manure showed remarkable ability for recovery, especially in flats which received complete fertilization or manure. A row of healthy beet seedlings and two rows of diseased seedlings were planted in each flat. Diseased seedlings grown in well-fertilized soil produced large plants, whereas diseased seedlings grown in soil fertilized with nitrogen, phosphorus, and potassium alone, or grown in the check soil, remained very small.—P.J.B.

1388 Giddings, N. J. **Some interrelationships of virus strains in sugar beet curly top.** *Phytopathology* 1950, **40**, 377-88.

1389 Hull, R. **Virus yellows in sugar beet.** *Farming* 1950, **4**, 72-7. [Dunholme Field Station, Lincs.]

A review of the situation in Great Britain and on on the Continent, with particular reference to control measures.—E.B.H.

CASSAVA

1390 Argentina, Ministerio de Agricultura y Ganaderia. Publ. Misc. No. 330. El cultivo de la mandioca. [**The cultivation of cassava.**] By *A. F. Bravo*. 1950, pp. 12, pl. 3.

1391 Nichols, R. F. W. **The brown streak disease of cassava.** *E. Afr. agric. J.* 1950, **15**, 154-60, bibl. 3, pl. 4. [E.A.A.F.R.O., Amani, Tanganyika Territory]

OIL CROPS

MISCELLANEOUS

1392 Grace, N. H., Lips, H. J., and Zuckerman, A. **Canadian erucic acid oils. 5. Physical, chemical and edible properties of oil from weed seed screenings.** *Canad. J. Res.* Sect. F. 1950, **28**, 401-11, bibl. 10.
Lips, H. J., Grace, N. H., and Jegard, S. **Canadian erucic acid oils. 3. Shortenings from rape and mustard seed oils.** *Canad. J. Res.* Sect. F. 1949, **27**, 28-34, bibl. 7.
Grace, N. H., Lips, H. J., and Hamilton, E. M. **Canadian erucic oils. 1. Refining and bleaching.** *Canad. J. Res.* Sect. F. 1948, **28**, 349-73, bibl. 12.

See also *Field Crop Abstracts* 3, Abs. 502.

1393 Norgaard, J. B. Skal vi dyrke Oliehor, Sennep eller vinterraps? [**Shall we grow linseed, mustard or winter rape (in Denmark)?**] *Dansk Frøavl* 1950, **33**, 121-6.

The Danes, like the Swedes, should change over to the cultivation of winter rape. The oil factories require only a limited quantity of linseed, Denmark's total linseed requirements being about 20,000 ha. Yellow mustard, because of its low yield and low oil content, cannot compete with winter rape.—R.P.J.

1394 Svensk Frötidning. Sveriges oljeväxtodlares Centralförenings verksamhet 1949. [**The work of the Central Association of Swedish Oil Crop Growers in 1949.**] *Svensk Frötidn.* 1950, **19**, No. 6-7, 73-6.

Oil crop cultivation was begun in Sweden in 1940 on an area of 400 ha., the growers numbering 250. By 1949 the area was 141,800 ha. and the number of growers 29,546. In 1949, according to a preliminary computation, the kg. per ha. yields were: autumn rape 2000; autumn rybs (*Brassica rapa oleifera*) 1070; spring rape 1250; white mustard 900, and linseed 1160.—R.P.J.

BRASSICA

1395 André, E. Sur la composition chimique de l'essence de graines de moutarde brune. Hérédité biochimique et hybridation. [**On the chemical composition of brown mustard oil (*Brassica juncea*). Biochemical heredity and hybridization.**] *C.R. Acad. Agric. Fr.* 1949, **35**, 644-9, bibl. 1.

1396 Andersson, G. Svalöfs Primex vitsenap. [**Svalöfs Primex white mustard**]. *Sverig. Utsädesför. Tidskr.* 1950, **60**, 234-6, [English summary].

Svalöf's Primex white mustard is a new variety, selected from X-ray-treated commercial seed. Primex was tested in fifty-seven trials during 1944-1949 and in these it outyielded the ordinary commercial seed on the average by 4 per cent. Its oil content in thirty-seven trials was 30.3 per cent compared with 29.4 per cent in ordinary commercial seed. The yield of oil per ha. from Primex is 6 per cent higher than from the commercial seed.—R.P.J.

1397 Lorensson, A. Inför en ny oljeväxtsäsong. [**On the eve of a new oil crop season.**] *Lantm. Svenskt Land* 1950, **34**, No. 31, 603-4.

On Gotland's mineral soils, and to a large extent on the mainland, autumn rape gives a yield at least 50 per cent greater than spring-sown rape. Autumn rape should be sown from 1st to 20th (possibly 25th) August, the earlier the better. Autumn rybs (*Brassica rapa oleifera*) should replace rape for sowings after 20th to 25th August; it can be sown up to 5th, or even 10th, September. The seed-rate for rape has in recent years been increased from 8-10 kg./ha. to 12-14./ha. With rybs 6-8 kg., or even 10 kg./ha. should be sown.—R.P.J.

1398 Anerud, K. För hösten aktuella skadeinsketer på raps och rybs. [**Autumn insect pests causing injury to rape and rybs (*Brassica rapa oleifera*) (in Sweden).**] *Svensk Frötidn.* 1950, **19**, 98-101.

1399 Kovalenko, A. [**Mustard in Stalingrad province.**] [Russian]. *Sovet. Agron.* 1950, **8**, No. 8, 87-9.

In experiments at Stalingrad Province Agricultural Experiment Station mustard proved to be a satisfactory nurse crop. Compared with cereals it possesses many advantages as a nurse crop; its growing period is shorter than most spring cereals; 30 to 35 days elapse from the appearance of the mustard seedlings to their flowering which is sufficient time for normal rooting in lucerne; the size of seed in mustard and in perennial grasses is approximately the same so that both can be sown with ordinary tractor-drawn seeders, whereas in sowing grasses under a cereal nurse crop complicated re-adjustment of the seeder is necessary.—R.P.J.

SUNFLOWER

1400 Isip, I. N. [**Autumn sowings of sunflower with freshly harvested seed.**] [Russian] *Sovet. Agron.* 1950, **8**, 90-3.

In the Tambov province in 1948 autumn sowing of sunflower was carried out on 1300 hectares. In 1949 autumn sowing of this crop had extended far beyond the confines of that province and was being investigated on a large scale in Western Siberia. Data showed that the yields from autumn sowings were from 2 to 6 centners per hectare larger than those from spring and early winter sowings. To obtain successful results from autumn sowing the seeds used should be in the phase of wax ripeness. —R.P.J.

1401 ROSBACO, U. F. and ROSBACO, Aurora de M. de Relacion entre el numero de hojas y la precocidad en girasol. [**Relation between the number of leaves and precocity in sunflower.**] *Rev. Invest. Agron. B. Aires* 1949, **3**, 303-4, bibl. 4. [Est. Exp. Nacional Tezanos Pinto, Rep. Argentina] [Received 1950]

In an experiment with fifty plants of each of eight varieties of *Helianthus annuus* a close relationship was observed between the number of leaves and precocity.—N.G.S.

1402 TRAVERSI, Blanca A. Estudio inicial sobre una enfermedad del girasol (*Helianthus annuus* L.) en Argentina. [**Initial study on a disease of sunflower (*Helianthus annuus* L.) in Argentina.**] *Rev. Invest. Agron. B. Aires* 1949, **3**, 345-51, pl. 7.

Enormous losses in Argentina are caused to sunflower crops (*Helianthus annuus*) by a new and very infectious disease which is identified as of virus origin. It is transmitted by : sap inoculation ; through the seed ; and by *Thrips tabaci*, *Myzus persicae*, and *Trialeurodes vaporariorum*. A list of other susceptible plants is given. Seven plates, of which four are coloured, illustrate the symptoms of the disease on sunflower.—N.G.S.

LINSEED

1403 ANDERSSON, G. Råd till oljelinodlarna. [**Advice to growers of oil flax (in Sweden).**] *Svensk Frötidn.* 1950, **19**, 101.

Oil flax should be harvested when the capsules are brown. It should be cut with the self-binder and well dried on the field. The seed should be light brown and lustrous.—R.P.J.

1404 VILLAR, A. D. Comportamiento de cinco variedades comerciales de lino oleaginoso. [**Behaviour of five commercial varieties of linseed.**] *Memoria de la segunda reunion de lino* 1949, 100-3. [Est. Exp. Oliveros, Argentina]

ROSBACO, Aurora de M. de Comportamiento de linos oleaginosos en Tezanos Pinto, y consejos de siembra. [**Behaviour of linseed at Tezanos Pinto, and advice on sowing.**] *Memoria de la segunda reunion de lino* 1949, 104-5. [Est. Exp. Tezanos Pinto, Argentina]

DAVREUX, M. A. Comportamiento de cinco variedades de linos oleaginosos en Pergamino. [**Behaviour of five varieties of linseed at Pergamino.**] *Memoria de la segunda reunion de lino* 1949, 106-10. [Est. Exp. Pergamino, Argentina]

As a result of trials, Querandí M.A. was noted as the best variety at all three stations. Klein II was second best at Oliveros and Pergamino, and Entre Rios second best at Tezanos Pinto. Early sowing is urged.—N.G.S.

1405 MARCIOTTE, C. V., KUGLER, W. F., and DAVREUX, M. A. Resultados de cinco años de ensayos comparativos de rendimiento con linos oleaginosos. [**The results of five years comparative yield trials of linseed.**] *Memoria de la segunda reunion de lino* 1949, 111-7. [Est. Exp. Pergamino, Argentina]

Where a sound rotation is practised, there is little difference between the yields of Charrúa M.A., Querandí M.A., Entre Rios, and H8-2-10-1-1. Where the soil is "flax-sick" Charrúa M.A., and H8-2-10-1-1 are most suitable. Late sowing ought to be avoided, but if unavoidable, then H8-2-10-1-1 gives the best results. Since it produces seed of the highest commercial quality, Charrúa M.A. should be sown whenever possible.—N.G.S.

1406 LEMOS, O. R. Amplitud de variation de las caracteristicas industriales de la semilla en variedades y selecciones de linos oleaginosos. [**Extent of variation in the commercial characteristics of the seed of linseed.**] *Memoria de la segunda reunion de lino* 1949, 60-71.

The percentage of oil, dry matter, iodine indexes and the weight of 1000 seeds are given for 359 varieties. The best results were given by selection 13844.—N.G.S.

GROUNDNUTS

1407 BLEDSOE, R. W., and HARRIS, H. C. **The influence of mineral deficiency on vegetative growth, flower and fruit production, and mineral composition of the peanut plant.** *Plant Physiol.* 1950, **25**, 63-77, bibl. 23. [Univ. Florida, Agric. Exp. Sta., Gainesville]

Results are given of studies, conducted in 1945 on *Arachis hypogaea*, on the need of an external supply of nutrients to the fruiting organ for normal fructification and also on the evaluation of salt movement from the fruiting organs to the vegetative tissue when differential nutrient treatments were applied to the root medium. Peanut plants of the Dixie Runner variety were grown in sand culture with a complete nutrient solution applied to the isolated fruiting media, while the roots, after 80 days of growth on a complete solution, received various deficient nutrient solutions. Vegetative growth, fruit production, and mineral composition of plant parts were adversely affected and nutrient deficiency symptoms developed when any macroelement was withheld from the roots of plants after 80 days. When the roots were receiving the complete solution, and the fruiting zone distilled water only, fruit production was negligible. Gynophores have a greater absorptive capacity for potassium and calcium than for phosphorus or magnesium from the external supply in the fruiting medium. The root, however, is the primary absorbing organ of the peanut plant and in no case was the absorption of an element by the gynophores sufficient to offset the appearance of nutrient deficiency symptoms of that element when it was omitted from the roots of the plants.—D.B.

1408 HARTLEY, C. W. S., and KEEPING, G. S. **Experiments on the cultivation of groundnuts, 1947-9.** *Malay. agric. J.* 1950, **33**, 32-7, bibl. 1.

A tabulated summary is given of the results of experiments carried out during 1947-9. Varieties showed marked differences in yielding capacity. Kedah variety yielded more than Serdang, or imported Siam varieties, at Serdang ; and Perak and Kedah varieties more than the Siam variety at Penang. The optimum planting distance was 1 ft. by 1 ft. Planting in beds had no advantage over planting on the flat. The optimum maturation period for variety Kedah was 100 days. The effect of lime, potash, phosphate, and cattle manure under different conditions was noted. The yield appeared to be governed by the distribution of rainfall over the growing period. Cultivation of groundnuts in the off-season on padi land led to a similar increase in the padi yield to that obtained by the cultivation of other food crops in the off-season.—N.G.S.

1409 YARBROUGH, J. A. ***Arachis hypogaea.* The seedling, its cotyledons, hypocotyl and roots.** *Amer. J. Bot.* 1949, **36**, 758-72, bibl. 35. [N. Carolina Agric. Exp. Sta., Raleigh]

This is a developmental, morphological, anatomical and physiological study of the early life of the Virginia Bunch variety of *A. hypogaea*. For comparative purposes limited observations have been made on White's Runner, Spanish, and Valencia varieties.—D.B.

1410 INDIAN FARMING. **Research on the storage of groundnuts in Madras Province.** *Indian Fmg* 1950, **11**, 27-9.

The precautions to be taken by groundnut producers and dealers to improve marketing quality are given. The crop should be harvested only when it is fully mature, it should be stored in the pod, and its moisture content should not exceed 5 per cent. When the kernels have to be stored care should be taken during decortication (the grate-type decorticator is most suitable) so as to reduce the proportion of split and broken kernels. The summer crop of groundnuts is best utilized for local crushing and should not be stored for long periods. All godowns and groundnut containers should be clean, disinfected by fumigation, free from pests, and rat proof. The best dunnage for storing appears to be dry sand 1 ft. deep, covered by clean gunny cloth.—K.O.

1411 CARVALHO, T. de A roseta do amendoim (*Arachis* virus 1 (Zim.) Smith). [**Rosette of groundnuts.** (***Arachis virus 1*** **(Zim.) Smith**).] *Gaz. Agric. Mozambique* 1949, **1**, 10-13, bibl. 5, illus.

Rosette is caused by a virus of which *Aphis laburni* is a vector. The symptoms are described and illustrated. In order to control the disease, the following eight steps are advocated : (a) select good seed ; disinfect seed with Abavit B, Agrosan GN, or Ceresan if in shell, or with Arasan, Semesan, Spergon or Phygon if decorticated ; (b) grow on rich or well-fertilized soil ; (c) sow as early as possible ; (d) sow in double lines, so that each plant is 4 to 6 in. apart and the distance between each double line is 24 to 32 in ; (e) use erect rather than prostrate forms for late plantings ; (f) cultivate large areas ; (g) surround the groundnut area with crops of a different nature ; (h) establish a rotation in which groundnuts are not grown on the same ground, or its immediate vicinity, more than once in 4 years ; (i) destroy all volunteer groundnuts.—N.G.S.

1412 INDIAN FARMING. **Pests and diseases of groundnut in Madras Province.** *Indian Fmg* 1950, **11**, 71-2. [Indian Central Oilseeds Committee]

Stomopteryx sp., can be controlled by setting up light-traps, using a small hurricane lantern. As the light-trap is effective only within a distance of 50 yards one trap is therefore required for every 1.6 acres. The use of these traps is economic. Of five insecticides tried, 5 per cent DDT dust proved most effective, reducing infestation by more than 50 per cent. Leaf-spot disease, *Cercospora* sp., is easily controlled by common fungicides, such as Bordeaux mixture, sulphur, Bouisol, colloidal copper, etc. The most effective of these is 0.75 per cent Bordeaux mixture. These fungicides, especially those containing copper, stimulated groundnut growth.—N.G.S.

SAFFLOWER

1413 CLAASSEN, C. E., EKDAHL, W. G., and SEVERSON, G. M. **The estimation of oil percentage in safflower [*Carthamus tinctorius*] seed and the association of oil percentage with hull and nitrogen percentages, seed size and degree of spininess of plant.** *Agron. J.* 1950, **42**, 478-82, bibl. 3.

1414 CLAASSEN, C. E. **Natural and controlled crossing in safflower, *Carthamus tinctorius* L.** *Agron. J.* **42**, 381-4, bibl. 4. [Nebraska Agric. Expt Sta., Lincoln]

As a result of interest in safflower as a possible new oil-seed crop, a breeding programme was started in 1942 at the Nebraska station. Experiments to determine the amount of natural crossing occurring and to evolve a satisfactory technique for making controlled crosses are reported. Natural crossing was found to vary in individual safflower plants between 0 and 100 per cent. Although there was extreme variability among plants in the extent of their natural crossing, most plants were found to be from 5 to 40 per cent outcrossed. Insects accounted for most cross pollination in Nebraska.—From author's summary.

1415 PRASADA, R., and CHOTHIA, H. P. **Studies on safflower rust in India.** *Phytopathology* 1950, **40**, 363-7, bibl. 6. [Indian Agric. Res. Inst., New Delhi]

Safflower rust (*Puccinia carthami*) attacks the cultivated safflower, *C. tinctorius* and the wild species, *C. oxyacantha*. The rust appears on *C. oxyacantha* in January near Delhi, the inoculum on the wild species contributing to the appearance of rust on *C. tinctorius* in January and February. Teliospores are formed in April, some germinating very soon, others need a 5 or 6 month resting period before germination. The resting teliospores remain viable over the winter on plant debris in the soil and bring about fresh infection the following season. The rust has been shown to be seed-borne also. It is concluded that control measures should include the burning of plant debris after harvest, seed treatment with fungicides and the eradication of the wild species, *C. oxyacantha*.—P.J.B.

FIBRE CROPS

FLAX

1416 BESSER, E., MONTONNA, R. E., and SMITH, F. **Chemical delignification of flax straw and other cellulosic materials.** *Nature, Lond.* 1950, **166**, 195-6. [Div. Agric. Chem., Univ. Minnesota, St. Paul]

In USA a great quantity of flax is grown for seed and not for fibre. The above department has therefore been studying the possibilities of using seed-flax straw, and has initiated a chemical method for retting the straw in which lignification has been complete. Details of the method by which straw is treated for 2 hours at 155°C. under pressure with an aqueous solution containing sodium hydrosulphite are to be published elsewhere.—M.H.

1417 FRÖIER, K. Odling och beredning av lin och hampa i Nederländerna, Belgien och Nordfrankrike. [**Cultivation and processing of flax and hemp in the Netherlands, Belgium and northern France.**] *Sverig. Utsädesfören. Tidskr.* 1950, **60**, 117-53, [English summary].

At the request of the Swedish Government's Flax Committee, the author visited the Netherlands, Belgium and northern France in 1949 to study and report on flax and hemp growing and processing. This report touches on matters of special interest for Sweden.—R.P.J.

1418 FREDERIKSEN, P. S. Høstning af Spindher. [**Harvesting of fibre flax.**] *Ugeskr. Landm.* 1950, **95**, 433-6, 453-86. [Danish Institute of Flax Research]

Before the last world war flax pulling was done almost exclusively by hand, but mechanization of this work is becoming increasingly general. Different types of machines used in Holland and Belgium are described and illustrated by photographs.—R.P.J.

1419 KUGLER, W. F., MARCIOTTE, C. V., and DAVREUX, M. A. Comportamiento de las variedades Mapun, M.A. and Achay, M.A. en ensayos comparativos de rendimiento. [**Behaviour of the [flax] varieties Mapun M.A. and Achay, M.A. in comparative yield trials.**] *Memoria de la segunda reunion de lino* 1949, 123-39. [Est. Exp. Pergamino, Argentina]

1420 MARCIOTTE, C. V., KUGLER, W. F., and DAVREUX, M. A. Comportamiento de dos linos de tipo intermedio obtenidos en la estacion experimental de Pergamino. [**Behaviour of two intermediate types of flax at the Pergamino Experimental Station.**] *Memoria de la segunda reunion de lino* 1949, 118-22. [Est. Exp. Pergamino, Argentina]

The two intermediate types were H28-1-0-0-1-2-2-5, and H131-1-3-3-5-3.—N.G.S.

1421 Serrano, H. Lucha contra las malezas del lino con el 2,4-D. [**Fighting the weeds of flax with 2,4-D.**] *Memoria de la segunda reunion de lino* 1949, 79-85, illus. 6. [Est. Exp. Pergamino, Argentina]

It was shown that 2,4-D (Weed-no-more, and Tufor) gave complete control over *Chenopodium zobelii*, *Ch. hircinum*, *Brassica campestris*, *Carduus acanthoides*, *C. nutans*, var. *macrocephalus*, and *Cirsium vulgare*; and limited control over *Amaranthus hybridus* var. *quitensis*, *Polygonum convolvulus*, and *P. aviculare*. As flax is more sensitive to 2,4-D than cereals, lower concentrations may be used than with grain crops. The stage of growth of the flax at the time of application is very important, since if 2,4-D is applied too early the young flax may be killed, and if applied at flowering time the seed yield may be decreased. The optimum time of application is when the flax is about 15 cm. or 6 in. high. 2,4-D may also be applied successfully after seed formation in order to clear the weeds and thus facilitate the flax harvest. Treatment with 2,4-D retards maturity in flax, but yield and germination capacity are not affected.—N.G.S.

1422 Hjelmqvist, H. **The flax weeds and the origin of cultivated flax.** *Bot. Notiser*, 1950, **2**, 257-98.

The special weeds which occur in fields of *Linum usitatissimum* furnish some guidance but no definite information on the ancestral species of cultivated flax. The history of flax weeds indicates that the flax in Central Europe has migrated from the south and the east; on the one hand, from the Mediterranean region (probably its eastern part) and on the other hand, from a more eastern, Asiatic, region. In the mountainous regions of Central Asia there possibly exists a wild form from which the cultivated flax may in part derive its origin.—R.P.J.

1423 Godoy, E. F., and Bruni, O. Aspectos diversos de la roya del lino *Melampsora lini* (Pers. Lev.). [**Various aspects of rust in flax *Melampsora lini* (Pers. Lev.).**] *Memoria de la segunda reunion de lino* 1949, 41-4. [Est. Exp. Pergamino, Argentina]

The following were found to be immune to rust: linseed varieties, Charrúa M.A. and H.8; flax varieties, Mapún M.A., Achay M.A., 4980-2, 405-4-1-1, 323-4-2-2, 1186610, H100, H184 and H185.—N.G.S.

1424 Godoy, E. F., and Bruni, O. Aspectos diversos del pasmo del lino (*Septoria linicola* (Speg.) Garass). [**Various aspects of pasmo in flax (*Septoria linicola* (Speg.) Garass).**] *Memoria de la segunda reunion de lino* 1949, 32-5. [Est. Exp. Pergamino, Argentina]

Results are given showing the resistance of twenty-one varieties of linseed and five varieties of flax to pasmo.—N.G.S.

1425 Godoy, E. F., and Bruni, O. Suelos cansados de lino en la region linera. [**Flax-sick soils in the flax-growing area.**] *Memoria de la segunda reunion de lino* 1949, 4-8. [Est. Exp. Pergamino, Argentina]

Considerable losses may occur between sowing and harvesting flax due to defective germination, wilting, etc. Monoculture and alternate cropping with wheat is common so that after a while the land becomes flax-sick and the farmer moves to virgin soils. Soils are notably flax-sick in the provinces of Entre Rios, Santa Fe, and North Buenos Aires. A healthy field will yield 15 q. per ha. as against 4-6 q. on flax-sick land. The causes of flax sickness are shown to be the fungi *Pythium ultimum*, *Rhizoctonia solani* and *Fusarium lini*, which attack the plant at all stages of growth. Most of the popular varieties are very susceptible, but Querandí M.A. shows moderate resistance, while Charrúa M.A. is characterized by exceptional resistance to *F. lini*, the most dangerous of the three fungi.—N.G.S.

1426 Ribiero, R. Ensayos de resistencia al " Marchitamiento " del lino. [**Experiments on the resistance of flax to wilt.**] *Memoria de la segunda reunion de lino* 1949, 21-8, bibl. 4. [Instituto fitotécnico " La Estanzuela," Uruguay]

Eleven varieties of flax were studied in relation to their resistance to wilt. Three experiments are described, in which the varieties Charrúa M.A. and Minuano were outstanding.—Author's summary.

1427 Santini, B., and Huici, J. J. Ensayo comparativo de rendimiento con fungicidas. [**Comparative trials of fungicidal treatments of flax.**] *Memoria de la segunda reunion de lino* 1949, 9-18.

1428 Sackston, W. E. **Effect of pasmo disease on the yield and thousand kernel weight of flax.** *Canad. J. Res.*, Sect. C. 1950, **28**, 493-512, bibl. 43. [Bot. and Plant Path. Div., Agric. Dept, Ottawa]

Field trials were carried out on flax to determine the amount of infection resulting from inoculations of pasmo (*Septoria linicola*) at different stages of crop growth and the reaction of the new rust-resistant varieties Crystal and Viking and the standard varieties Redwing and Royal. In order of susceptibility to pasmo, Viking was first, followed by Redwing, Royal and Crystal. Seed yields and kernel weights were most markedly reduced by inoculations of pasmo at flowering time; inoculations of young plants at 30 to 40 days after seeding reduced the yields to a lesser extent, whilst inoculation at the time of ripening did not significantly alter the seed yield, as compared to control plants. Flax was affected by pasmo in much the same way as by adverse weather conditions and rust infection; plant development was retarded, the time of ripening was reduced, plants were shorter and branched less while the 1000-kernel-weights were markedly lower than in healthy plants.—P.J.B.

1429 LONDON, Ministry of Supply. Permanent records of research and development. Mono. No. 16. 202. **Insect pests of flax.** By *I. Thomas* and *H. M. Edelsten*. 1948, pp. 8. [Lithoprint]

A survey on the incidence of flax pests in England and Wales undertaken by advisory entomologists in 1942 revealed that flax was less susceptible than most crops to attack. Of the 429 fields examined, only 118 showed signs of insect damage, caused largely by *Cnephasia virgaureana*, *Longitarsus parvulus*, *Aphthona euphorbiae*, slugs, wireworms and leather jackets. Leather jackets accounted for the largest number of failures, but the flax flea beetle may be expected to become more troublesome if the crop is grown on a considerable scale for a period of years.—E.B.H.

HEMP

1430 CYGULEV, V. I. [**Growing southern hemp (*Cannabis sativa*) without spatial isolation.**] [Russian] *Agrobiologija* 1950, No. 5, 25-35. [Krasnodar]

Experiments conducted at the Azov/Black Sea Experimental Station indicated that in the best varieties of southern hemp, such as South Krasnodar and the local varieties Kavkazsk and Nevinnomysk, valuable industrial properties are increased as a result of inter-varietal and extra-varietal cross pollination.—R.P.J.

COTTON

1431 AGAPOV, A. I. [**Ridge cultivation of cotton.**] [Russian] *Sovet. Agron.* 1949, **7**, No. 6, 56-67.

Trials of the ridge method were conducted in three differing soil/geographical zones: (1) Kazahstan SSR, (2) Uzbek SSR, and (3) Azerbaĭdjan SSR. In every case the yield of cotton was considerably higher than from sowing on the flat.—R.P.J.

1432 BAROOAH, S. R., and DE, B. **Hill cotton in Assam.** *Indian Cott. Gr. Rev.* 1950, **4**, 65-9. [Dept Agric., Assam]

The article describes the distribution, cultivation and marketing of the hill cotton strains *Gossypium arboreum* vars. *cernuum*, *neglectum* and *typicum*, in Assam.—K.O.

1433 SAWHNEY, K. **Need for augmenting supplies of cotton in the Indian Union.** *Indian Cott. Gr. Rev.* 1949, **3**, 115-20. [Indian Central Cotton Committee, Bombay]

The cultivation of suitable perennial types of cotton on cultivable land is a possible means of increasing cotton production without affecting the food crop position. Perennial cotton requires wide spacing and thus permits the growing of food crops in the inter-row spaces. Although further trials are necessary before recommendation can be made for general adoption, observations indicate that perennial cotton would be a good substitute for the popular L.S.S. cotton from Pakistan.—K.O.

1434 BEDERKER, V. K. **Future cotton growing problems of Hyderabad State.** *Indian Cott. Gr. Rev.* 1950, **4**, 79-88, bibl. 3. [Cotton Res. Sta., Nanded]

Although Hyderabad is one of the main cotton growing areas of India, the yield of seed cotton and lint per acre there is low. The limit of improvement by single plant selection from the local varieties appears to have been reached in the varieties Gaorani 6, Gaorani 6E-3, and Gaorani 12. Certain types which could be used in breeding for improved yields are recommended. The trial of improved American varieties under Hyderabad conditions is suggested. The improvement of agronomic practices and the planning of production are required. Three problems demanding investigation are: a study of the lodging habit of Gaorani 6E-3; photoperiodic studies with *G. arboreum* L. var. *neglectum* forma *indica* H.G.; and genetic studies of *indicum* cotton.—N.G.S.

1435 NAVKAL, H., and SEN, D. L. **Prediction of the spinning value of cottons belonging to different botanical species from their chief fibre properties.** *Indian Cott. Gr. Rev.* 1949, **3**, 144-60. [Technol. Lab., Matunga]

1436 STEVENSON, G. C. **Some historical notes on the cultivation of cotton in British Guiana.** *Trop. Agriculture, Trin.* 1949, **26**, 67-8.

1437 PONSONBY, C. E. **Cotton production in Brazil.** *Emp. Cott. Gr. Rev.* 1950, **27**, 90-9.

An outline of Brazilian cotton production during the past 30 years is based on reports of journeys of the International Cotton Mission through São Paulo and other States in 1921-23, and, more recently, on the Report of the Joint U.S.-Brazil Technical Commission, 1948. In São Paulo, seed production and distribution is State controlled, to ensure uniformity of type. A new variety, Campinas 817, reputedly superior to the two American Upland types, is soon to be available. Throughout the country federal and State governments are trying to overcome primitive cultivation methods, inadequate labour and poor farming systems and to exploit to the fullest extent Brazil's cotton potentialities.—E.B.H.

1438 GROHMANN, F., and CATANI, R. A. O empobrecimento causado pela erosão e pela cultura algodoeira no solo do Arenito Bauru. [**The impoverishment in the soil of Arenito Bauru caused by erosion and the cultivation of cotton.**] *Bragantia* 1949, **9**, 5-8, 125-32, bibl. 14. [Inst. Agronômico Campinas, São Paulo, Brazil]

The impoverishment of the soil caused by erosion and cultivation of cotton was studied in experimental plots where traps were used to collect the soil removed by erosion. These tests were carried out on the Arenito Bauru soil type, on which 80 per cent of the cotton in the State of São Paulo is cultivated. Preliminary results indicated that impoverishment by erosion is extremely rapid. It was shown that loss of organic matter and chemical elements was due more to erosion than to the use made of these by the cotton plants.—N.G.S.

1439 GUERRA, E. C. Instrucciones para el cultivo del algodon. [**Instructions for the cultivation of cotton (in Colombia).**] *Agric. Trop.* 1949, **5**, 9-11 and 15-8.

A popular account for farmers. The traditional varieties of cotton cultivated in Colombia are Hibrido Nativo, Express, and Deltapine. These are low-yielding and of poor and variable quality. An attempt is being made to obtain improved varieties by selection.—N.G.S.

1440 GODOY, C., Jr. Cultura do algodoeiro. Influência dos adubos fosfatados sôbre alguns caracteres físicos da fibra e da semente. [**Cultivation of cotton. The influence of phosphatic fertilizers on some physical characters of the fibre and the seed.**] *Rev. Agric. Piracicaba* 1950, **25**, 175-90, bibl. 11.

1441 GODOY, C., Jr. Cultura do algodon. Influência dos adubos fosfatados sôbre a composição da semente. [**Cotton cultivation. Influence of phosphatic fertilizers on the composition of the seed.**] *Rev. Agric. Piracicaba* 1950, **25**, 283-90.

1442 CHENG, K. S. **Some observations on the root development of tree-cotton in Yunnan.** *Emp. Cott. Gr. Rev.* 1950, **27**, 119-22, bibl. 4.

Tree-cotton growing under Kaiyuen soil and moisture conditions has a vertical penetration of over 15 ft., while a maximum of 18 to 20 ft. is quite probable. The tap roots make stout growth in the soil and may pass through several layers of hardpan varying from 1 to 3 ft. in thickness. The results of these observations and some successful instances in level planting all showed that digging a large hole as previously recommended is certainly unnecessary. Soil conditions greatly affect the root system. With deep soil of uniform texture the tap root grows almost vertically downwards, while a gravelly hardpan makes it pursue a zigzag course and appear much compressed at times. The outward spread of roots usually exceeds 6 ft. and extends sometimes to 9 ft. or more. Nearly all of them run close to the surface, and on account of the wide spacing only a few of them grow appreciably downwards. The important feeding area therefore lies in the upper 2 feet, and a good surface soil is likely to be more effective than a localized planting hole.—From author's summary and discussion.

1443 AFZAL, M., and KAHN, A. H. **Natural crossing in cotton in Western Punjab. I. Natural crossing in contiguous plants and rows.** *Agron. J.* 1950, **42**, 14-9, bibl. 18. [Cotton Res. Lab. Lyallpur, Pakistan]

A study was made of the extent of natural crossing where different types of cotton were grown in contiguous holes or rows. In both cases natural crossing took place to an extent of about 2 per cent of the plants. There was no marked difference between the extent of crossing under similar circumstances between local and American acclimatized cotton varieties.—From authors' summary.

1444 PAKISTAN. **The silver fibre. Pakistan cotton —present, past and future.** By *N. Ahmad.* **Pakistan cotton—area and yield.** By *M. Fasihuddin.* [**n.d.**] pp. 67, tbl. 21.

A well-illustrated popular review of cotton production in Pakistan.—K.O.

1445 NORTH CAROLINA Agricultural Extension Service. Ext. Circ. No. 345. **7 steps to efficient cotton production.** 1950, pp. 15.

1446 OKLAHOMA Agricultural Experiment Station. Bull. No. B-345. **Cotton growing in eastern Oklahoma. A comparison of present methods and recommended practices.** By *W. F. LaGrone.* 1950, pp. 31.

1447 TEXAS Agricultural Experiment Station. Bull. 713. **Responses of cotton to 2,4-D.** By *D. R. Ergle* and *A. A. Dunlap.* 1949, pp. 18.

Four groups of cotton plants in the pre-bloom stage were treated with amounts of the sodium salt of 2,4-D equivalent to 0.002, 0.01, 0.02 and 0.04 mg. of 2,4-D acid, respectively. Plant height and the number of main stalk internodes increased in proportion to the amount of 2,4-D applied; for the heaviest dosage, the increase was 38 and 21 per cent, respectively. The formation and growth of vegetative branches was stimulated by the two largest applications, though the largest application repressed the development of fruiting branches. Injury to the main stalk leaves, as reflected in the reduction of leaf weight, increased progressively from 27 per cent (0.01 mg.) to 77 per cent (0.04 mg.). The 0.002 mg. application produced no visible signs of leaf modification or injury. As compared with untreated controls, the 0.02 and 0.04 mg. applications suppressed flower production 7 and 33 per cent and depressed seed-cotton yields 20 and 58 per cent, respectively. In the main stalk leaves, the sucrose, cellulose and hemicellulose concentrations increased and the reducing sugar and organic acid concentrations decreased as the amounts of 2,4-D applications increased.—From authors' summary.

1448 WADLEIGH, C. H., and FIREMAN, M. **Salt distribution under furrow and basin irrigated cotton and its effect on water removal.** *Proc. Soil Sci. Soc. Amer.* 1948, **13**, 527-30. [U.S. Dept Agric., Riverside, Calif.]

1449 BALLS, W. L. **Natural selection in Egypt's cotton crop.** *Emp. Cott. Gr. Rev.* 1950, **27**, 243-59, bibl. 11.

1450 HUTCHINSON, J. B. **A note on some geographical races of Asiatic cottons.** *Emp. Cott. Gr. Rev.* 1950, **27**, 123-7, bibl. 8.

The perennial forms of *G. arboreum* in Africa are assigned to two races, race *soudanense* in the Sudan and West Africa and race *indicum* on the East African coast and in Madagascar. *G. herbaceum* is classified into five races; race *persicum* in south central Asia, race *kuljianum* in Chinese central Asia, race *acerifolium* in north Africa and Arabia, race *wightianum* in western India, and race *africanum* in South Africa.—Author's summary.

1451 GOVANDE, G. K., and JOSHI, N. V. **The inheritance of agricultural characters in three inter-strain crosses in cotton.** *Indian Cott. Gr. Rev.* 1950, **4**, 46-51, bibl. 4. [Dept Agric., Baroda State]

1452 KAHN, A. H., and AFZAL, M. **Natural crossing in cotton in Western Punjab. IV. Agents of natural crossing.** *Agron. J.* 1950, **42**, 236-8, bibl. 13. [Cotton Res. Lab., Lyallpur, Pakistan]

Studies showed that insects were the principle factor in bringing about the natural cross-pollination of cotton and that wind pollination did not take place in Lyallpur. The hymenopterous species *Apis dorsata*, *Elis thoracica*, and *Anthophora confusa*, were the principle pollen-carrying insects. These insects, in the main, preferred to stay in one cotton field and not to migrate, a factor offering a partial explanation of the efficacy of an open space between adjacent cotton fields as a barrier to natural crossing.—P.J.B.

1453 KUBERSINGH. **The extension of the improved varieties of cotton in member-States of Central India and Rajputana.** *Indian Cott. Gr. Rev.* 1950, **4**, 106-17, [Inst. Pl. Indust., Indore]

This article describes the work, of the Institute of Plant Industry, Indore, in the multiplication and distribution of seed of improved cotton varieties. —N.G.S.

1454 NARAYANAYYA, D. V. **Gaorani 12—its suitability to the entire kharif cotton area of Hyderabad State.** *Indian Cott. Gr. Rev.* 1949, **3**, 187-93. [Cotton Research Station, Nanded]

On the basis of its all round performance, coupled with its more vigorous habit and wilt resistance, Gaorani 12 can be safely recommended as the one variety suitable for the nine districts of Hyderabad State in which 82 per cent of the kharif cotton grows. The 1,500,000 acres that will eventually be under this variety will probably be the largest area under any one improved cotton variety in India.—From author's conclusion.

1455 O'KELLY, J. F. **Registration of improved cotton varieties, IV.** *Agron. J.* 1950, **42**, 53. [Bureau of Plant Ind., U.S. Dept Agric.]

The agronomic characters of the varieties Empire and Lankart-57 are briefly summarized.—P.J.B.

1456 OKLAHOMA Agricultural Experiment Station. Tech. Bull. No. T-37. **Oklahoma cotton variety tests, 1944 to 1948.** By *I. M. Parrott, N. M. Gober,* and *T. H. Green.* 1950, pp. 46.

1457 TENNESSEE Agricultural Experiment Station. Bull. 211. **Cotton varieties and related studies 1936 through 1948.** By *N. I. Hancock.* 1949, pp. 55, bibl. 54.

Among the contents of this bulletin are the following: plant characters and seed products; 10-years' results from nine representative cotton varieties, with tabulated data on yields of seed-cotton and lint, earliness, boll- and seed-size and lint index; similar data for other varieties, compared with a check; variations in lint properties and bolls; the influence of various factors, including upland versus bottom land, soil series and analysis, low versus high rainfall, defoliation, 2,4-D poisoning, cover crops, lime, phosphate and potash; yield and quality of cottonseed; varietal purity and breeding; adaptation of varieties. There are forty tables.—P.J.B.

1458 Texas Agricultural Experiment Station. Bull. 719. **Cotton variety tests in the El Paso Valley, 1943-48.** By *J. Lyerly, L. S. Stith, G. F. Henry* and *D. T. Killongh.* 1950, pp. 18.

1459 United States, Department of Agriculture. Tech. Bull. No. 1,000. **Mote types in cotton and their occurrence as related to variety, environment, position in lock, lock size and number of locks per boll.** By *N. L. Pearson.* 1949, pp. 37.

1460 Beltran, M. L. La variedad de algodon "Deltapine 12" en la zona norte del Departamento del Tolima. [**The cotton variety Deltapine 12 in the north zone of Tolima province, (Colombia).**] *Agric. Trop.* 1949, **5**, No. 7. 14.

The selection Deltapine 12 gives the best results in this region. It has a growing period of 120 days, thus permitting two crops to be taken in a year. It yields 875 kg. of seed cotton per ha., and up to 1500 kg. on the best soils. Its ginning percentage is 36 and its staple $1\frac{1}{16}''$.—N.G.S.

1461 Ganesan, D. **Sizes and densities of seeds sown, and their effect on vigour and yield in cotton.** *Indian Cott. Gr. Rev.* 1950, **4**, 37-45, bibl. 7. [Inst. Plant Industry, Indore]

Experiments were started in 1941-42 on genetic and non-genetic methods and cultural treatments for increasing seed weight and size of desi cotton (*Gossypium arboreum*) and Upland cotton (*G. hirsutum*). *G. arboreum* responded better to mechanical selection of the heavier seed, done by sieving for size and by separation in liquid for density. Under ideal conditions of soil moisture and aeration the dense seeds with well-developed contents were the quickest to absorb moisture and to germinate, but under water-logged conditions they suffered in germination and yield through lowered respiratory activity and the leaching of reserve food. Selection for density appeared profitable in the bigger-seeded varieties whether they belonged to desi or Upland cotton strains.—K.O.

1462 Gracie, D. S. **An analysis of the factors which govern the response to manuring of cotton in Egypt. Parts I and II.** *Emp. Cott. Gr. Rev.* 1950, **27**, 100-18, and 177-94.

The methods of experimentation carried out at stations in Upper and Lower Egypt during 1931-46 are described. From the results it appears that the only practical means for increasing the efficiency of nitrogenous fertilizers over the whole country is to raise the general yield level to the extent permitted by locality and season; the main concern being to increase the number of early bolls, as yields from late bolls are limited and uncertain. On deteriorated soils in particular, attention must be given to other factors determining yield: e.g., spraying, irrigation, time and method of sowing. These factors are discussed.—E.B.H.

1463 Mirchandani, R. T. **Green manuring of standing cotton crop.** *Indian Cott. Gr. Rev.* 1950, **4**, 89-94. [Directorate Marketing and Inspection, New Delhi]

Green manuring of standing cotton with Cluster bean, *Cyamopsis psoralioides*, was investigated in Sind. Two methods were used. In the first, Cluster beans were drilled between the cotton rows, and then buried *in situ*. This resulted in an increased cotton yield of 15-20 per cent. The other method was to grow Cluster beans from the end of May to July, preceding wheat, and to cut, cart, and bury them in cotton plots elsewhere. This had no ill effect on the succeeding wheat crop, and also resulted in an increased yield of cotton. Costings given show that both these practices are economic.—N.G.S.

1464 Olson, L. C. **Response of cotton to lime on Georgia soils.** *Proc. Soil Sci. Soc. Amer.* 1948, **13**, 388-90, bibl. 12. [Georgia Agric. Exp. Sta.]

An average increase of 56 lb. of seed cotton per acre per year from the broadcast application of about 0.5 ton of ground limestone per acre is evidence of the value of this practice. Exchangeable calcium appears to be a more reliable method for determining the lime needs of soils than the soil pH.—A.D.H.

1465 Fairbank, J. P., and Smith, K. O. **Cotton mechanization in California.** *Agric. Engng, St. Joseph, Mich.* 1950, **31**, 219-22.

The importance of cotton in California and the high cost of production has emphasized the advantages of mechanical picking. The paper discusses cultural practices designed to aid mechanical picking, without reducing yields. Losses in machine picking are concentrated in the lower 6 inch zone of the plant. Investigations of the effect of different plant densities showed that close spacing improved yields slightly, compared with wide spacing, and reduced the number of bolls in the lower 6 inch zone, thus improving harvesting efficiency. No significant differences in harvesting efficiency were observed between bed and flat planting. Mechanical thinning and cross blocking did not significantly improve yield and picking efficiency as compared with hand thinning and no thinning at all. Weed and grass control is an important factor in harvesting efficiency and yield. The following subjects are discussed: the relative merits of various herbicides; the use of flaming for weed control; the value of uniformity in spacing; height, and row profile of the crop; defoliation. Comparative costings for mechanical and hand picking are given.—P.J.B.

1466 TEXAS. Agricultural Experiment Station. Bull. 720. **The cleaning of mechanically harvested cotton.** By *H. P. Smith, D. L. Jones,* and *H. F. Miller.* 1950, pp. 48.

1467 DHARMARAJULU, K. *et al.* **Studies on host resistance of cotton to stem weevil *(Pempherulus affinis).*** *Indian J. agric. Sci.* 1948, **28**, 151-64, bibl. 7.

Studies on host resistance of cotton indicated that the resistant varieties were able to engulf and disintegrate the burrowing larvae of *Pempherulus affinis* in the gummy exudate released at the affected regions. Two South American varieties Verdao and Peruvian (*G. barbadense*) and Moco (*G. purpurascens*) were found to be highly resistant under conditions of heavy artificial infestation. Two varieties, Bourbon (*G. purpurascens*) and Nadam (*G. arboreum* var. *typicum*) were found to be tolerant and able to withstand damage by quick repair of the affected regions. The local variety, strain Co2, though susceptible, was superior to other resistant varieties in yield, habit, and boll characters. Attempts to breed for resistance were made. Earthing up of the basal regions of the stem to obstruct oviposition, close spacing to cut off light, and crop mixtures to mask plant odour, did not reduce the infestation of the insect or the extent of mortality. No relation appeared to exist between morphological characters and host resistance.—From authors' summary.

1468 PATEL, R. M. **Control of cotton spotted bollworm *(Earias fabia, S.)* in Baroda.** *Indian Cott. Gr. Rev.* 1949, **3**, 135-43, bibl. 2. [Agric. Dept, Baroda]

The Baroda State Agricultural Pests and Diseases Act 1940 made it compulsory for every farmer to uproot cotton stalks before 15 May as a control measure against the spotted bollworm (*Earias fabia.* These measures in 1946-7 reduced the spotted bollworm infestation in shoots, buds, and bolls to 0.5, 0.7, and 1.9 per cent respectively, and increased the cotton crop yield by 19 per cent.—K.O.

1469 PEARSON, E. O. **Field key to the principal disorders of cotton in Africa.** *Emp. Cott. Gr. Rev.* 1950, **27**, 10-5.

1470 SUDAN, Ministry of Agriculture. Mem. Res. Div. No. 6. **Control of *Empoasca lybica* de Berg., on cotton in the Anglo-Egyptian Sudan.** By *J. W. Cowland* and *C. J. Edwards.* 1949, pp. 13, bibl. 1, illus. 2.

A short account of the life-cycle and symptoms of damage of the cotton jassid, *Empoasca lybica,* is given. In the initial cage experiments it is shown that DDT emulsion was superior to the copper compounds used. Experiments on the residual toxicity of DDT and Gammaxane sprays are described. Tests with DDT emulsion showed that young cotton is injured by an emulsion containing as little as 0.025 per cent DDT, but that emulsions containing up to 0.5 per cent DDT can be used with safety on plants which are 2 months old. A coarse DDT suspension caused severe leaf distortion, but a fine suspension used later was quite safe at the concentration applied. Field experiments with copper oxychloride (Blitox) and DDT emulsion were carried out. Blitox did not give good control, but 0.1 per cent and 0.05 DDT emulsion gave excellent kills and remained toxic to jassids for 2 to 3 weeks. The benefit of spraying with DDT emulsion is amply demonsstrated by the increased yields obtained.—From authors' summary.

1471 NORTH CAROLINA Agricultural Experiment Station. Ext. Circ. No. 312 (revised). **Cotton insect control in North Carolina, 1950.** By *W. M. Kulash* and *G. D. Jones.* 1950, pp. 11.

A practical guide to the use of BHC, toxaphene, chlordane and calcium arsenate in the control of cotton pests in North Carolina.—P.J.B.

1472 PRESLEY, J. T. ***Verticillium* wilt of cotton with particular emphasis on variation of the causal organism.** *Phytopathology* 1950, **40**, 497-511, bibl. 33. [Mississippi Agric. Expt Sta., State Coll.]

The paper reports studies on wilt of cotton caused by *Verticillium albo-atrum.* Tests carried out showed that applications of nitrogen to the soil appeared to promote the development of wilt and that potassium appeared to reduce it; the pathogen flourished best in soils with a high organic matter content and a high pH. The appearance of the wilt on cotton in areas not previously under cultivation was shown to be due not to seed-borne infection, but probably to the presence of the *Verticillium* organism natural to the virgin soil. The most practical method of wilt control is the development of resistant cotton varieties. Most of the commercial Upland cottons (*Gossypium hirsutum*) appear to be susceptible to the wilt, whereas varieties of Egyptian, Pima, Sea Island and the S. American cottons (*G. barbadense*) are highly resistant. Progress in the development of resistant varieties is reported. The task is complicated by the fact that not all cotton varieties react in the same way to the disease in different localities, due probably to the existance of a number of biotypes of *Verticillium.* Work is in progress at the Mississippi Agric. Expt Sta. where the resistant variety Hartsville is being back-crossed to confer its resistance upon locally adapted varieties of Upland cotton.—P.J.B.

1473 UNITED STATES, Department of Agriculture, Bureau of Agriculture and Industrial Chemistry. AIC-262. **Detection of "honeydew" on raw cotton.** By *M. F. Stansbury* and *C. L. Hoffpanir.* 1950, pp. 4. [Mimeographed]

The paper describes a technique for the detection of "honeydew" in raw cotton by means of ultraviolet ray fluorescence.—P.J.B.

1474 UNITED STATES, Department of Agriculture, Bureau of Entomology and Plant Quarantine. E-792. **Early-season application of insecticides for cotton-insect control.** By *K. P. Ewing* and *C. R. Parencia.* 1949, pp. 9.

A total of 19 fields covering 380 acres were given two early-season treatments of one of the new all-purpose insecticides for the control of cotton pests. Detailed seasonal records were kept to determine the time of maturity of early-treated cotton and to determine the need, if any, for boll-worm (*Heliothis armigera*) control. In the early-season treatments, nearly 100 per cent control of thrips, *Psallus seriatus* and *Anthonomus grandis*, was secured, sprays and dusts being equally effective. There was a seasonal average of four times as many blooms on the treated as on the untreated cotton, and the early-season treatments advanced maturity by approximately 3 weeks. Two late-season treatments were made for bollworm control, the resulting increase in yield being only 9.6 per cent over the untreated fields. In most fields a full crop of cotton was secured before bollworms appeared. The importance is emphasized of stopping early-season treatments in time to give beneficial insects at least 4 weeks to build up their numbers sufficiently to achieve bollworm control.—P.J.B.

1475 PEDRIQUE, A. R. El Picudo del algodon en Venezuela. [**Picudo of cotton in Venezuela.**] *Agric. Venez.* 1950, **14**, 25-8, illus.

A popular account of the measures taken to control a plague of Picudo (*Anthonomus grandis*). A description is given of the methods used to eradicate wild cotton, an alternative host plant, using compounds of 2, 4.5-T.—N.G.S.

JUTE

1476 SEN GUPTA, J. C., SENN, N. K., and MUKHERJEE, D. K. **Effect of sowing time on growth and development of jute. II.** *Indian J. agric. Sci.* 1948, **28**, 129-36, bibl. 2. [Received 1950] [Presidency Coll., Calcutta]

Corchorus capsularis (D.154) and *C. olitorius* (Chinsura green) were sown at intervals of 30 days on the 1st April, 1st May, 31st May, and 30th June. Plants were removed at intervals of 30 days, and the growth and development recorded. The vegetative period was progressively shortened as the sowing was delayed; the reductions in this, and in the time to flowering and fruiting, being more marked in *C. capsularis*. Dry weight, height, and the number of nodes at the fruiting stage decreased with the lateness of sowing after the 1st May. The first sown plants had a lower growth rate than the 1st May sown plants, and their dry weights were also less, but, they ultimately accumulated more dry matter, due to their longer vegetative period. It was shown that optimum conditions for growth resulted from the 1st May sowings. Favourable factors for growth are: high temperature and long daily periods of bright sunshine in the early stages, and high humidity, coupled with high rainfall, in the later stages.—N.G.S.

CROP BOTANY

PLANT PHYSIOLOGY AND BIOCHEMISTRY

1477 PLATT, R. B., and WOLF, J. N. **General uses and methods of thermistors in temperature investigations, with special reference to a technique for high sensitivity contact temperature measurement.** *Plant Physiol.* 1950, **25**, 507-12, bibl. 7. [Univ. Pennsylvania]

1478 BURRIS, R. H. **Isotopes as tracers in plants.** *Bot. Rev.* 1950, **16**, 150-80, bibl. 161. [Univ. Wisconsin]

This paper makes no claim to be an exhaustive survey of the literature, nor does it describe methods in detail. It is a literature review of the results obtained when radioactive elements are used in the study of ion absorption and exchange, transport of nutrients, photosynthesis, heterotrophic fixation of carbon dioxide, biological nitrogen fixation, metabolism of nitrogen and of phosphorus, phytopathology, plant-growth regulators, and stimulation of growth. A final section outlines some potential uses of isotopes as tracers.—D.B.

1479 PRATOLONGO, U. Fosfati e perfosfati. [**Phosphates and superphosphates.**] *Humus, Milan* 1950, **6**, No. 4, 3-5.

Recent developments in the use of isotopes for the study of the absorption of phosphorus compounds are reviewed.—E.B.

1480 BROYER, T. C. **Further observations on the absorption and translocation of inorganic solutes using radioactive isotopes with plants.** *Plant Physiol.* 1950, **25**, 367-76, bibl. 12. [Univ. Calif., Berkeley]

1481 ALEXANDER, L. T. **Radioactive materials as plant stimulants—field results. (Summary).** *Agron. J.* 1950, **42**, 252-5. [Bureau of Plant Ind., U.S. Dept Agric.]

The summarized data are given of experiments carried out to determine the effect on the growth of various agricultural crops of the radioactive materials alphatron, radium and uranyl nitrate. The general conclusion drawn was that no effect on plant growth was observable, either beneficial or otherwise.—P.J.B.

1482 WHALEY, W. G., HEIMSCH, C., and RABIDEAU, G. S. **The growth and morphology of two maize inbreds and their hybrid.** *Amer. J. Bot.* 1950, **37**, 77-84, bibl. 12. [Univ. Texas, Austin, and the Clayton Foundation for Research, Austin, Texas]

Two inbred lines of maize and their hybrids were grown in aerated culture solutions and their growth was analysed in terms of total weight increase, increase of shoot and root weights, increase of internode length and volume, and increase of leaf length and area. The hybrid gained an early advantage with respect to each of these characteristics, and maintained the advantage to maturity. There were, however, different patterns of growth in each of the lines with respect to each of the characters. The two inbreds and the hybrid were shown to have distinctly different patterns of leaf growth, the hybrid being intermediate between the inbreds as to leaf number but with earlier formed and more rapidly growing leaves than either inbred. [See also next two abstracts] —From authors' summary.

1483 HEIMSCH, C., RABIDEAU, G. S., and WHALEY W. G. **Vascular development and differentiation in two maize inbreds and their hybrid.** *Amer. J. Bot.* 1950, **37**, 84-93, bibl. 11. [Univ. Texas, Austin, and the Clayton Foundation for Research, Austin, Texas]

Anatomical features were considered at progressive stages in the ontogeny of the plant. The developmental differences between inbred lines and hybrids were evident not only in size and number of parts (vascular bundles, xylem vessels) but in earliness of development. The early advantage of the hybrid over the inbred lines is shown in two ways. The maximum number of vascular bundles was attained earlier in development (in the lower internodes), and the maximum diameter of xylem vessels was spread over a larger number of internodes. [See also previous and next abstracts.]—D.B.

1484 RABIDEAU, G. S., WHALEY, W. G., and HEIMSCH, C. **The absorption and distribution of radioactive phosphorus in two maize inbreds and their hybrid.** *Amer. J. Bot.* 1950, **37**, 93-9, bibl. 13. [Univ. Texas, Austin, and the Clayton Foundation for Research, Austin, Texas]

The object was to determine among two inbred lines and their hybrid, whether differences in absorption and distribution of radioactive phosphorus were correlated with morphological and anatomical differences. Individual plants were grown in a nutrient solution enriched with radioactive phosphorus contained in 1 gal. crocks and radioactivity measurements were made on plant tissue samples and on the residual nutrient solution. The results indicated that the correlation existed and that the rate of phosphorus absorption was concerned with hybrid vigour. The pattern of distribution of phosphorus was the same in all plants studied ; it was concentrated in regions of active growth. The hybrid, however, having a larger root system, absorbed greater amounts of phosphorus, its development was more rapid and the concentration of radioactive phosphorus reached its maximum value in the various plant parts earlier than in the inbred lines. [See two previous abstracts.]—D.B.

1485 RUDRA, M. N., and CHOWDHURY, L. M. **Methionine content of cereals and legumes.** *Nature, Lond.* 1950, **166**, 568. [Dept Med. Chem., Darbhanga Med. Coll., Lakerisarai, Bihar]

The methionine contents of the following plants are recorded : *Oryza*, *Triticum*, *Zea*, *Phaseolus*, *Cicer*, *Lens*, *Lathyrus* and *Cajanus*. There is indication that methionine deficiency is the factor responsible for lathyrism, and also for the low nutritive value of lentil protein.—M.H.

1486 BRÜCHER, H. En ny biokemisk snabbmetod för bestämning av grobarhet hos spannmål. [**A new biochemical rapid method for determination of germinating power in cereals.**] *Sverig. Utsädesfören. Tidskr.* 1950, **60**, 210-4, [English summary]. [Institute of Genetics, Tucumán, Argentina]

It has been found possible to elaborate biochemical methods of testing the viability of seeds, depending on their content of certain enzymes. Earlier methods had disadvantages, such as the poisoning of the seeds and the slowness of the reactions.

The new method is based on the assumption that a correlation exists between viability and the oxidizing action of peroxidase in the seed. Seeds which have lost their germinating capacity through ageing, high moisture or heat, show a decreased enzyme activity. A colour test estimates the peroxidase activity. The intensity of colour after treatment with benzidine or guaiacol corresponds with the germinating capacity of the seeds. The method is particularly suitable as a quick test in maize.—R.P.J.

1487 Burström, H. **Studies on growth and metabolism of roots. 2. n-diamylacetic acid and assimilation of nitrate.** *Physiol. Plantarum* 1949, **2**, 332-40. [Bot. Lab., Lund Univ.]

Experiments were carried out to determine the influence of n-diamylacetic acid on the nitrate assimilation of wheat roots. The acid caused a marked decrease in the nitrate assimilation of the roots in concentrations as low as 10^{-7} mol though it was seen that only the nitrate assimilation and not the nitrate absorption or accumulation was affected. This inhibition could be prevented by the addition of manganese and, to a lesser extent, iron. The significance of these results is discussed ; it is considered that in the normal root there are substances acting in a similar way to n-diamylacetic acid, the function of manganese being the counteraction of the effect of these substances.—P.J.B.

1488 Burström, H. **Studies on growth and metabolism of roots. 3. The adaptation against growth inhibition by aliphatic C_{12} and C_{11} acids.** *Physiol. Plantarum* 1950, **3**, 175-84. [Bot. Lab. Univ. Lund, Sweden]

The action of undecanoic and dodecanoic (lauric) acid on the elongation of wheat roots was studied in cultures with flowing nutrient solutions and under constant environmental conditions. Cells in process of elongation are specifically sensitive to these acids ; but neither meristems nor derivatives of meristems developed in the presence of the acids.

Undecanoic and dodecanoic acids do not share with di-n-amylacetic acid the property of interfering in the assimilation of nitrate, and the general physiological difference between the acids is emphasized.—R.P.J.

1489 . Bonner, W. D., Jr., and Thimann, K. V. **Studies on the growth and inhibition of isolated plant parts. III. The action of some inhibitors concerned with pyruvate metabolism.** *Amer. J. Bot.* 1950, **37**, 66-75, bibl. 20. [Harvard Univ. Cambridge, Mass.]

See also *Herb. Abstr.* 18, Abs. 762 and *Fld Crop Abstr.* 2, Abs. 1258. Fluoride inhibits growth of isolated sections of *Avena* coleoptiles and *Pisum* stems, but the inhibition differs from that demonstrated in previous experiments because it is not reversed by organic acids or sulphhydryl agents. It does not show significant variation with the age of the plants, and the quantitative effect for a given fluoride concentration is about the same on *Avena* as on *Pisum*. Respiration of coleoptile section is not inhibited by fluoride until concentrations become higher than 4×10^{-3}M. Of other chemicals used, purified pyruvate and 1-amino-2-naphthol-4 sulphonic acid (a carboxylase inhibitor) promote growth. Fluoroacetate inhibits growth. " From the data in this and the two preceding papers, it is possible to put together a few fragments of the metabolic system which leads to growth in these isolated sections of coleoptile or stem. The experiments with iodoacetate and other sulfhydryl inhibitors and with the organic acids, as well as the highly aerobic nature of the growth, leave no doubt that the oxidative metabolism of the dicarboxylic acids in some way provides either energy or material for the growth process. The inhibition produced by fluoride is less easy to analyse. A careful study of the effects of fluoride on growth through a wide range of concentrations has given some evidence (not presented here) for the participation of two different fluoride-sensitive processes in growth. The more sensitive of these may be concerned with phosphorylation but the evidence is not yet clear, and a study of the interrelationships between fluoride, hexose phosphate and hexose plus phosphate will be reserved for a future communication. The nature of the less fluoride-sensitive process, i.e., the one with which this paper is principally concerned, remains obscure."—D.B.

1490 Bear, F. E. **Cation and anion relationships in plants and their bearing on crop quality.** *Agron. J.* 1950, **42**, 176-8, bibl. 8. [New Jersey Agric. Expt Sta., Rutgers Univ., New Brunswick, N.J.]

The following equation expresses the overall cation-anion equivalent relationship in plants at any given pH value:

$$\frac{K+Ca+Mg+Na}{N+P+S+Cl+Si} = \text{constant.}$$

This was borne out in experiments on alfalfa, which tended to maintain constant me. sums of K+Ca+Mg+Na cations and N+P+S+Cl+Si anions per unit of dry matter regardless of wide variations in the number of me. of the individual cations or anions. Application of Cl to soils as KCl tends to substitute Cl for N+S+P in plants and thus lower their protein content. Plants high in mineral cation content tend to have a high content of protein and organic acid. As the yields of plants are raised to high levels, their mineral and protein contents per unit of dry matter tend to suffer carbohydrate dilution, thus high quality in food crops may not be compatible with the highest crop yields.—P.J.B.

1491 Školjnik, M. Ja., and Makarova, N. A. [**Antagonism of iron and copper.**] [Russian] *Doklady Akad. Nauk SSSR* 1950, **70**, 121-4, bibl. 4. [Komarov Bot. Inst., Acad. Sci. USSR]

The study concerns culture experiments in which flax and sunflower were used.—M.H.

1492 Trudova, R. G. [**Displacement of the isoelectrical point of cell colloids in plants under the influence of Röntgen rays.**] [Russian] *Doklady Akad. Nauk SSSR* 1950, **72**, No. 1, 197-9.

The experimental material consisted of root tips of oat seedlings. On the basis of the results obtained it may be assumed that irradiation with Röntgen rays changes not only the electro-colloidal but also the chemical attributes of the protein of the nucleus and of the protoplasm, as a result of which these cell components become more heterogeneous in their composition.—R.P.J.

1493 Doroganevskaja, E. A. [**Changes in chemical composition of plants as affected by geographical factors.**] [Russian] *Doklady Akad. Nauk SSSR* 1950, **71**, 387-90, bibl. 12. [Geogr. Inst., Acad. Sci. USSR]

In 1934 the work of Flaksberger showed that the average percentage content of protein in wheat grain varied in different parts of European Russia as follows: northern, 11.8; north-west, 14.3; west, 14-6; north-east, 15.3; central, 16.7; Ukraine, 18.5; south-east 18.9. The author has reviewed in a general way the problem of changes in protein of wheat in relation to the growth stage of the plant and the climatic factors, temperature and moisture.—M.H.

1494 Tombesi, L. Fotosintesi, quoziente respiratorio, traspirazione, attività catalasica ed ossidasica di alcune specie vegetali in rapporto alle disponibilità idriche del suolo. Nota I. [**Photosynthesis, respiratory quotient, transpiration, catalase and oxidase activity of some plant species in relation to availability of water in the soil. Note I.**] *Ann. Sper. agr.* 1950, **4**, 481-510, [English summary, p. 510]. [Sta. chim. agr. sper., Roma]

A series of investigations was started in 1946 at the above station in Rome. In the introductory part to this first note, an account is given of progress made during recent years. The technique for determining photosynthesis and transpiration activities, respiratory and photosynthetic quottients, and catalase and oxidase activities, is explained. The plants tested included *Vicia faba*, *Arachis hypogaea*, and *Phaseolus vulgaris*. The results, which are tabulated, show that the unit water consumption (whole plant and seeds only) varies greatly according to the supply of water. There is a minimum value of water consumption which corresponds to the most efficient utilization of water.—E.B.

1495 Tombesi, L. Fotosintesi, quoziente respiratorio, traspirazione, attività catalasica ed ossidasica di alcune specie vegetali in rapporto alle disponibilità idriche del suolo. Nota 2. [**Photosynthesis, respiratory quotient, transpiration, catalase and oxidase activity of some plant species in relation to availability of water in the soil. Note 2.**] *Ann. Sper. agr.* 1950, **4**, 511-36, bibl. 20, [English summary, p. 534-5]

See also previous abstract. The highest content of chlorophyll and of cuticle wax, and the lowest cellulose and lignin content in the vascular system are found in plants receiving the lowest amounts of water. The photosynthetic intensity, determined in *Vicia faba*, was higher in plants grown with a low water supply. The respiratory quotient of the plants grown with a low water supply was generally higher in the morning than in the afternoon. The respiratory intensity which increased in the afternoon was higher when the plants were grown with a low water supply. The catalase activity was studied in *Phaseolus vulgaris*, the oxidase activity in *Vicia faba* and both catalase and oxidase activities in *Arachis hypogaea*. Results indicated that (a) catalase content of green tissues decreases with plant age, and does not vary much in relation to water supply or to time of day; (b) in *V. faba* the oxidase content is higher in the afternoon than in the morning, it is higher in plants receiving a low water supply and it increases with age of the plant.—From author's conclusions.

1496 Corns, W. G. **Effects of 2,4-D and soil moisture on the catalase activity, respiration and protein content of bean plants.** *Canad. J. Res.* Sect. C. 1950, **28**, 393-405, bibl. 20. [Plant Sci. Dept, Alberta Univ., Edmonton, Alta]

Bean plants grown under various controlled moisture conditions in a greenhouse and sprayed with 2,4-D, showed differences in catalase activity, CO_2 output, total nitrogen content and visual response. The catalase activity and leaf respiration of leaves were stimulated or depressed according to the amount of soil moisture, 2,4-D concentration and time after treatment; but there was not always a positive correlation between the two activities. Leaf protein, with a few exceptions, was decreased by 2,4-D. The catalase activity, leaf respiration and protein content of stems were greatly increased by 2,4-D, particularly in plants in moist soil. Treatment of the soil with 2,4-D produced, in the above-ground parts of the plants, responses resembling those produced by foliage sprays of bean plants in moist soil with 2,4-D.

Fasciation of the underground parts of plants resulted only from soil applications of relatively dilute (50 ppm.) concentrations of 2,4-D.—From author's summary.

1497 PATTANAIK, S. **The effect of boron on the catalase activity of rice plant.** *Curr. Sci.* 1950, **19**, 153-4, bibl. 4. [Bot. Dept, Ravenshaw Coll., Cuttack, 3.]

Although work is still in progress, results have shown that catalase activity in the leaves and roots of rice plants, increased when boron was added. Activity was not uniform and was less in roots than in leaves.—K.O.

1498 EATON, F. M. **Influence of growth "hormones" on boll retention by cotton plants.** *Bot. Gaz.* 1950, **111,** 313-9, bibl. 4. [Texas Agric. Exp. Sta., College Station]

Under climatic conditions of the San Joaquin Valley of California dusting cotton plants during periods of active shedding with 100 ppm. of sodium 4-chlorophenoxyacetate and 1000 ppm. of naphthaleneacetic acid was without effect on boll retention in both 1947 and 1948. Spraying plants weekly with a 20 ppm. solution of sodium 4-chlorophenoxyacetate, in an experiment where naphthaleneacetate and naphthoxyacetate were without effect, significantly reduced the number of bolls per plant and the number of bolls per 100 grm. of stems and leaves and caused some increase in vegetative development.

The fruiting branches of the cotton plant are in some respect homologous to the inflorescences of other plants; under certain conditions cotton can develop either vegetative or fruiting branches to the exclusion of the other type. Only the fruiting branches produce flowers. Various synthetic-hormone sprays used on various types of cotton and under various conditions did not materially alter the kind or proportions of branches developed. The foregoing data provide little basis for believing that the late-season setting of cotton bolls can be increased by the use of the type of growth-regulating materials employed or for believing that these materials can alter materially the proportions of fruiting and vegetative branches. A florigen type of growth substance might, however, have marked effects. Also, the anti-auxin type of material remains to be studied.—Author's summary.

1499 EVANS, C. E., LATHWELL, D. J., and MEDERSKI, H. J. **Effect of deficient or toxic levels of nutrients in solution on foliar symptoms and mineral content of soybean leaves as measured by spectrographic methods.** *Agron. J.* 1950, **42**, 25-32.

1500 ROSENE, H. F., and WALTHALL, A. M. J. **Velocities of water absorption by individual root hairs of different species.** *Bot. Gaz.* 1949, **111**, 11-21, bibl. 8. [Univ. Texas]

Rosene's micropotometric technique was used to determine the velocity of absorption of Hoagland's solution at a pH of *ca.* 5 by individual root hairs of several species. Experiments were performed with the seedlings in moist air at different temperatures ranging from 19°C. to 30°C. Readings were taken at 10-minute intervals. The mean velocities of absorption by the root hairs within a species calculated in cubic micra per square micron of hair surface per minute were: barley, 0.3; oats, 0.5; wheat, 0.5; mustard, 1.2; corn, 1.7; and field pea, 4.4. Fluctuations in the velocity of absorption by individual root hairs from one 10-minute interval to another were independent of temperature changes. Small, gradual, temperature changes appeared to have no effect on the velocity of absorption by an individual root hair during any one experiment. Oats, barley, and wheat showed intermittent absorption of water at temperatures above 25°C. and continuous absorption at temperatures below 25°C. The results demonstrated that in any study on absorption by individual root hairs the age and length of each hair and the extent of the immersed area, as well as temperature, are important variables.—Adapted from authors' summary.

1501 WEATHERLEY, P. E. **Studies in the water relations of the cotton plant. 1. The field measurement of water deficits in leaves.** *New Phytol.* 1950, **49**, 81-97, bibl. 24. [Dept Bot., Univ. Manchester]

This paper describes how the relative turgidity method for assessing the water balance of plants was devised at Serere Experiment Station, Uganda, and discusses to what extent seasonal fluctuations in the water balance of cotton plants growing in the field are related to changes in environmental conditions. Disks punched from cotton leaves were made fully turgid by floating on the surface of water. Their water content was then measured and compared with that of similar samples taken directly from the field. The relative turgidity of the tissue was determined and the method was found useful for following water deficits in the field.—E.B.H.

1502 BALL, E. **Isolation, removal, and attempted transplants of the central portion of the shoot apex of *Lupinus albus* L.** *Amer. J. Bot.* 1950, **37**, 117-36, bibl. 34. [Univ. N. Carolina, Raleigh]

"This report is an account of the testing of the possibility of transplanting a bit of tissue from one shoot apex to another, the replacing of a transplant in the same or different orientation in the shoot apex, and the excision of the central part of the shoot apex. These experiments held promise of giving information on the method of growth of the terminal meristem." The transplants always died and the remains of the original shoot apex regenerated new apices which produced new shoots. These closely resembled the original shoot as regards histology and size of apices, phyllotaxis, numbers of vascular bundles, growth of the pith, differentiation of the first phloem and first xylem. "It is suggested that the shoot apex is a unit which shows a supracellular control over the cells contained within it, and if the unit is divided into two to four parts, each part may become a new, independent unit that produces a new meristem and a new shoot."—D.B.

1503 MORO, N. Influencia de pulverizaciones de cera emulsionada sobre transpiración y fotosíntesis en *Vicia faba* L. [**Influence of pulverised emulsions of wax on transpiration and photosynthesis in *Vicia faba* L.**] *Bol. Lab. Bot. La Plata.* 1950, No. 2, 2. [Author's summary only]

1504 MILLER, R. C., AURAND, L. W., and FLACH, W. R. **Amino acids in high and low protein corn.** *Science* 1950, **112**, 57-8, bibl. 6. [Frear Lab., Pennsylvania State Coll., Penn.]

Investigations were made to determine whether the amino-acid distribution in high-protein maize was different from that of low-protein maize. Data are tabulated for the average crude protein, lysine, methionine and tryptophane content of nine single crosses of hybrid maize. The data showed that the amounts of each of the amino acids varied directly with the crude protein contents of the crosses studied.—P.J.B.

1505 MOORE, R. H. **Several effects of maleic hydrazide on plants.** *Science* 1950, **112**, 52-3, bibl. 2. [Bot. Dept, Nebraska Univ., Lincoln]

The paper summarizes briefly the observed effects of the diethanolamine salt of maleic hydrazide at concentrations of 600 and 2400 ppm. on a number of mono-and dicotyledonous plant species.—P.J.B.

1506 LYND, J. Q., TURK, L. M., and COOK, R. L. **Nutrient deficiencies diagnosed with foliar analyses and plant tissue tests.** *Agron. J.* 1950, **42**, 402-7, bibl. 40.

1507 BARTON, Lela V. **Relation of different gases to the soaking injury of seeds.** *Contr. Boyce Thompson Inst.* 1950, **16**, 55-71, bibl. 14.

The experiments reported showed that soaking injury to the seeds of *Phaseolus vulgaris*, *Ph. lunatus*, *Pisum sativum*, *Vicia faba*, *Helianthus annuus*, *Avena sativa*, *Hordeum vulgare*, *Triticum aestivum*, and *Zea mays* was increased by passing oxygen through the water while soaking the seeds. Passing air, nitrogen or hydrogen in a like manner through the soaking water resulted in less injury than from oxygen, but did not permit subsequent normal seed germination. Bubbling carbon dioxide through the soaking water reduced the soaking injury to the seeds of a number of bean varieties, but caused decreased germination in some. In water aerated with mixtures of different proportions of oxygen and carbon dioxide, the injury to bean seeds increased as the proportion of oxygen increased; in water aerated with a mixture of 75 per cent carbon dioxide and 25 per cent oxygen, subsequent seed germination was not reduced. Both excised embryos and intact seeds of corn and sunflower were adversely affected by the oxygenation of the soaking water, but the embryos were more sensitive. A pronounced reduction in the rate of water absorption by bean seeds soaked in the presence of carbon dioxide indicated a direct relationship between the rate of water absorption and soaking injury. There was also a tendency for oxygenated beans to absorb water to an extent far in excess of their germination requirements; air induced greater water absorption than did nitrogen.—From author's summary.

1508 OLSEN, C. **The significance of concentration for the rate of ion absorption by higher plants in water culture.** *Physiologia Plantarum* 1950, **3**, 152-64. [The Carlsberg Laboratory, Copenhagen]

The experimental plants were *Secale cereale* and *Brassica oleracea acephala* var. It was shown that for a given ion the rate of ion absorption is independent of the concentration of the ion in the nutrient solution, except for the lowest concentrations, lying below 0.003 milligram equivalents per litre. The number of ions absorbed per unit of time is constant when absorption takes place from a single salt solution or from a composite nutrient solution; in the latter case, however, only if the proportion between the concentrations of the different ions in the nutrient solution does not change significantly during the experimental period. Should this change occur, the ratio in which these ions are absorbed is also changed. The rate of absorption from a composite nutrient solution is determined by the ratio between the concentrations of the ions in the nutrient solution, but not of their absolute concentration. The total absorption per unit time of cation or anion equivalents is constant.—R.P.J.

1509 Milner, M., and Johnson, J. A. **The influence of drying temperature and dry ice treatment on the quality of immature wheat.** *Cereal Chem.* 1950, **27**, 358-66, bibl. 5.

1510 Almestrand, A. **Growth factor requirements of isolated wheat roots. (A preliminary report.)** *Physiol. Plantarum* 1950, **3**, 293-9, bibl. 10.

Isolated roots of Weibull's Eroica wheat were cultivated in media according to methods already used for cultures of barley and oat roots. The wheat roots grew much better than barley and oats species and it was shown that of the vitamins, thiamin, pyridoxin and niacin, pyridoxin alone has a decisive effect on growth by promoting meristematic cell division. Optimal growth was obtained in pyridoxin concentrations of from 0.5 to 1.0 mg. per litre at 27-28°C.—R.P.J.

1511 Lundegårdh, H. **The time course of the ion absorption of wheat roots and the influence of the concentration.** *Physiol. Plantarum.* 1949, **2**, 388-401, bibl. 8. [Plant Physiol. Inst. R. Agric. Coll., Uppsala]

A recording conductometric method for the detailed study of the salt absorption of roots over long periods of time is described. The results of experiments with the apparatus show that salt absorption in roots starts with an induction period during which the process accelerates to a top value, the length of this period being 35 minutes at 20°C. This top value can be maintained for several hours, despite the increasing exhaustion of the salt solution, but in most cases there is a slow decline in salt absorption to an extent approximately linear to the logarithm of the salt solution concentration. —From author's summary.

1512 Lundegårdh, H. **The translocation of salts and water through wheat roots.** *Physiologia Plantarum* 1950, **3**, 103-151. [Institute of Plant Physiology, Uppsala, Sweden]

A number of experiments were made to elucidate the processes co-operating in the ascent of sap in wheat roots. In the main, the results corroborate previous work performed at Uppsala on sap movement, but they modify or extend some previous conceptions. For example, a translocation of salts longitudinally through the cortex has no practical importance for the ascent of sap because the salts at all levels are primarily transported radially straight into the stele; further, the exudation of salts is not linked to anaerobic glycolysis.—R.P.J.

1513 Stenlid, G. **The effect of 2,4-dinitrophenol upon oxygen consumption and glucose uptake in young wheat roots.** *Physiol. Plantarum* 1949, **2**, 350-71. [Plant Physiol. Inst., R. Agric. Coll., Uppsala]

Studies are reported of the effect of 2,4-dinitrophenol (DNP) and other physiologically active substances on the O_2 consumption and glucose absorption of wheat roots. DNP in low concentrations increased the O_2 consumption and decreased the glucose absorption of the roots. The action of DNP was sensitive to pH; in neutral solutions higher concentrations being necessary to bring about the same effects on O_2 consumption. The uptake of DNP was shown to be more rapid in acid solutions, the greater uptake rate of DNP in acid solutions being apparently due to the rapid absorption of undissociated acid. The results of similar tests with other nitrophenols are given. The effect of DNP was thought to be a general one and not the result of some effect on a specific enzyme in the root. It is suggested that DNP, by affecting phosphorylation, removes some barrier and brings enzymes and substrates that are normally separated into contact with one another. —From author's summary.

1514 Sempio, C. **Metabolic resistance to plant diseases.** *Phytopathology* 1950, **40**, 799-819, bibl. 28. [Plant Physiopathology Inst., Univ. Perugia, Italy]

The metabolic defence mechanism of plants to parasitism is discussed. Photosynthesis, glycolysis, and respiration are shown to be important in determining the resistance capacity of the host plant's metabolism. Thus ecological conditions affect the level of resistance. Artificial resistance may be induced by chemical means. The possibility is noted of the plant stimulating the formation of isomeric compounds unavailable to the parasite and thus starving the latter.—N.G.S.

1515 Heljman, N. S. [**Concerning dehydrases of wheat seedlings.**] [Russian] *Biohimija* 1949, **14**, 79-85, bibl. 24. [A.N. Bach Inst. Biochem., Acad. Sci. USSR]

Results of experiments conducted with wheat of the variety Ukrainka indicated that etiolated wheat seedlings possess more active dehydrases than dormant grain. Extracts of endosperms are characterized by high dehydrasing activity, in contrast to extracts of sprouts, the activity of which is low. The dehydrase contained in the sprout and the endosperm is of the fermentative type, its amount in the sprout being small. In living sprouts there is a strong system of hydrogen removers which is inactivated on grinding the tissue in air.—R.P.J.

1516 Abolina. [**The importance of mineral nutrition at the vernalization stage.**] [Russian] *Selek. Semenovod.* 1949, No. 9, pp. 59-61.

Results from three experiments with spring wheat indicated that when the seeds passed through the vernalization stage in a phosphate solution, not only is there acceleration in development of the plants and the ripening of the grain, but also an increase in number of grains per ear and an improvement in the filling of the grain.—R.P.J.

1517 Abolina, G. I. [**Physiology of development of winter wheat on fallow and on stubble.**] [Russian] *Selek. Semenovod.* 1949, **16**, No. 11, 37-41.

At the time of pre-winter hardening there is a considerable reduction in the fixed and free water content in the tillering nodes of winter wheat: a more pronounced reduction was noted in sowings on stubble. Development proceeds more rapidly on stubble than on fallow.—R.P.J.

1518 Korjukaev, S. I., and Vinogradova, E. I. [**Duration of vernalization of winter wheat depending on dates when the seeds are harvested.**] [Russian] *Agrobiologija* 1950, 67-9. [Leningrad State Pl. Breed. Sta.]

Seed harvested in 1948 on 10 and 30 July and 15 August was vernalized in 1949 for 4, 25 and 35 days. The results of the experiments permit the assumption that development of the embryo depends to a great extent on the conditions of its nutrition. The conditions of nutrition of the embryo in ripe and unripe seed are different, a fact which, possibly, also causes differences in the development of the plants from these seeds. Plants from unripe seeds were observed to be less winter-hardy than those grown from ripe seeds.—R.P.J.

1519 Lu, T-C., and Loo, T-L. **Elongation of wheat coleoptile under the influence of minor elements, indole-3-acetic acid and other chemicals.** *Bot. Bull. Acad. Sinica* 1949, **3**, 186-201, bibl. 28. [Dept Biol., Nat. Chekiang Univ., Hangchow]

Elongation of intact coleoptile, decapitated coleoptile and excised coleoptile of wheat was promoted by culturing the seedlings in solutions of manganese sulphate, zinc sulphate and boric acid respectively or by applying lanolin paste containing these chemicals to the cut surface of the decapitated coleoptile. Copper sulphate suppressed the elongattion of the coleoptile, especially in lanolin paste. The effect of low concentrations of indole-3-acetic acid solution on the elongation was equal to, or slightly better than, that of redistilled water, but a large dosage inhibited elongation. Indole-3-acetic acid in lanolin promoted the elongation of the decapitated coleoptile. Colchicine and chloral hydrate behaved like the indole-3-acetic acid solution. Formaldehyde of low concentrations had no noticeable effect, but high concentrations were very toxic.—Authors' summary.

1520 Tang, Y. W. **The effect of indoleacetic acid upon the early growth of *Phaseolus* seedlings in dark and in light.** *Bot. Bull. Acad. Sinica* 1949, **3**, 178-86, bibl. 12.

The elongation of green hypocotyls of *Phaseolus* seedlings in light was accelerated by the addition of various concentrations of indoleacetic acid, but elongation of etiolated hypocotyls in the dark was inhibited. The development of the primary leaf and first internode of both green and etiolated bean plants was checked by the application of indoleacetic acid in spite of light conditions. Thickening of hypocotyls and especially etiolated hypocotyls occurred in the presence of indoleacetic acid. Dry weight per unit length of treated hypocotyls was greater than that of control plants. The effect of indoleacetic acid on the elongation of green hypocotyls in dark and etiolated hypocotyls in light was less significant.—From author's summary.

1521 Misra, G. **Effect of photoperiod on the flowering time of two late varieties of paddy.** *Curr. Sci.* 1950, **19**, 126-7, bibl. 10. [Bot. Dept, Univ. Allahabad]

The photoperiodic response of two late varieties of rice, T_{23} (a selection from Kala Sukhadas of Banda district) and T_{36} (a selection from a winter variety of Cuttack) from the United Provinces, when treated at different stages of seedling growth is reported. Short-day treatment from the early stages of growth of the plants greatly hastened the date of the first panicle emergence, but there was considerable difference between the two varieties in this respect. In view of the differences of response toward the short-day photoperiod, the variety T_{36} may be considered "sensitive" and T_{23} a "less sensitive" variety.—K.O.

1522 Côrte-Real, A. de O. T. Influência da duração relativa do dia e da noite no crescimento e desenvolvimento de algumas variedades de *Soja hispida* Moench. [**Influence of the relative length of day and night on the growth and development of some varieties of *Soja hispida* Moench.**] *Rev. Agron. Lisboa* 1943, **31**, 126-52, bibl. 26, pl. 9. [Received 1950]

Soybean varieties react in different manners to short photoperiods. This reaction not only depends upon the time at which the treatments are given, but also on the state of maturity of the plants. Short photoperiods induced premature flowering, depending on the stage of development of the plant at the beginning of the treatment and on the precocity of the variety. Plant behaviour was noticeably affected during treatments, the height of the plant and the length to breadth ratio of the leaves being affected. The number of husks and seeds and their weight were also affected, these effects being intimately connected with the precocity of the variety. The weight of plants is greatly influenced by treatment with short photoperiods after an already large vegetative development.—N.G.S.

1523 PARKER, M. W., HENDRICKS, S. B., and BORTHWICK, H. A. **Action spectrum for the photoperiodic control of floral initiation of the long-day plant *Hyoscyamus niger*.** *Bot. Gaz.* 1950, **111**, 242-52, bibl. 7. [U.S. Dept Agric., Bur. Plant Ind., Beltsville, Md]

1524 ROSBACO, U. F. Movimientos foliares y florales del Girasol. [**Foliage and floral movements of the sunflower.**] *Rev. Invest. Agric. B. Aires* 1949, **3**, 413-4.
Experiments were carried out at Tezanos Pinto on nine varieties of *Helianthus annuus* to observe the effect of light upon the orientation of flowers and leaves. The leaves follow the trajectory of the sun, their movement being more marked in the early stages of development, becoming almost nil at flowering. It is the leaves and not the flowers which move at right angles to the sun's rays. The leaves return to their natural position at midnight. The moon has no attraction for the leaves, but an electric light bulb (6v., 5 amps.) attracted them in 60 minutes. Lack of soil moisture and low temperatures inhibit movement. Leaf movement persists in slight cloud. Movements are more marked in *Verbesina encelioides*. See also *Herb. Abstr.* 14, Abs. 271.—N.G.S.

1525 DASTUR, R. H. **Growth studies on Sea Island *(barbadense)* cottons under Punjab and Sind conditions to determine the causes of their low yields.** *Indian Cott. Gr. Rev.* 1949, **3**, 121-34, bibl. 4. [Scheme for Cotton Physiol. Res., Indore]
The study of the growth of these cottons in the Punjab revealed that the suppression of the fruiting branches occurred at a time when they should be normally formed, on account of long days and prevailing high temperatures. When the temperatures dropped the crop came into normal flowering, but by that time the assimilatory activities of the plants were extremely low. Consequently, elaborated food materials were not available in adequate amounts for the growth and maturation of the bolls. The same was found to be true, though to a lesser degree, in the cottons grown in Sind. Nitrogen concentration in the leaves of *barbadense* type cotton grown in the Punjab was found to be much lower than the nitrogen concentration in the leaves of Egyptian cottons in Egypt at the time of fruiting, though it was equal to that found in the leaves of American cottons in the Punjab, at the same stage of development. The climatic conditions were found to be more suitable for the growth of these cottons in South Sind than in the Punjab, but they were not at all similar to those that prevailed in Egypt. The American cottons in the Punjab and Sind came into flower at the same times as the *barbadense* types but the former produced a normal crop of bolls as the assimilatory activities of the leaves of American cottons were found to be much higher at that stage than those of the leaves of *barbadense* types.—From author's summary.

1526 GALSTON, A. W. **Riboflavin, light and the growth of plants.** *Science* 1950, **111**, 619-24.

1527 ROBINSON, A. D., TOBIAS, C. H., and MILES, Barbara J. **The thiamine and riboflavin content of Manitoba grown wheat, oats and barley of the 1947 crop.** *Canad. J. Res.* Sect. F. 1950, **28**, 341-50, bibl. 9.

1528 GALSTON, A. W., and BAKER, Rosamond S. **Studies on the physiology of light action. II. The photodynamic action of riboflavin.** *Amer. J. Bot.* 1949, **36**, 773-80, bibl. 33. [Calif. Inst. Tech. Pasadena]
In vitro and *in vivo* experiments are described which show that riboflavin is the photoreceptor in the destruction of auxin by visible light and that riboflavin is involved in the phototropic curvature of *Avena* coleoptiles. See *Herb. Abstr.* 19, Abs. 869.—D.B.

1529 MANNING, H. E. **The effect of anthocyanin filters on plant behaviour and development.** *Butler Univ. Bot. Stud.* 1950, **9**, 203-11, bibl. 16.
Experiments were conducted with light filters made of anthocyanin to determine their effect on the growth of beans. Results indicated that both red glass and anthocyanin light filters produced similar effects on bean development and behaviour. Bean plants exposed to anthocyanin and red glass filtered light were photosynthetically stimulated to produce plants of greater total weight than control plants growing under white light, yet plants growing under the anthocyanin and red glass filters produced leaves only one-third of the size of the control plants. A 7-day exposure of bean plants to red light after sprouting, followed by growth in white light produced the best development of stem diameter and length, number and area of leaves, weight of pods and total plant weight. Exposure of bean plants to red light for 55 days appeared to be lethal to the plants; all exposures to red light (7, 14 and 30 days) reduced the root development compared with white light control plants.—From author's summary.

1530 GOODWIN, R. H., and TAVES, Carolyn. **The effect of coumarin derivatives on the growth of *Avena* roots.** *Amer. J. Bot.* 1950, **37**, 224-31, bibl. 20. [Connecticut Coll., New London]
The effect of coumarin and twenty-three of its

derivatives upon the growth-rate of *Avena* roots has been investigated. The compounds can be classified into four groups: (1) those which are very inhibitory at 10^{-3} molar and which have an increasingly depressing effect upon root growth with time; (2) those which are less potent, giving smaller inhibitions which do not increase with time; (3) those which have an initially inhibitory effect at 10^{-3} molar, from which the roots recover, in spite of repeated application of the compound; and (4) those which are relatively ineffective, giving inhibitions of less than 25 per cent at 10^{-3} molar.—From authors' summary.

1531 WEINTRAUB, R. L., and BROWN, J. W. **Translocation of exogenous growth-regulators in the bean seedling.** *Plant Physiol.* 1950, **25**, 140-9, bibl. 17. [Camp Detrick, Frederick, Md]

Experiments were undertaken with *Phaseolus vulgaris* to ascertain whether translocation of applied growth-regulators might be influenced by specific food material, such as sugars, artificially supplied to the leaf. When applied to a seedling leaf devoid of translocatable carbohydrates, growth regulating substances were not transported from leaf to stem, but this movement was brought about by supplying various sugars to the leaf externally. Since growth regulators of diverse molecular structure were transportable and since several different sugars brought about the movement, it is unlikely that there was chemical union between the growth regulating substance and the sugar. The primary need appeared to be the setting into action of the normal translocatory process.

"Growth-regulator translocation of the type facilitated by sugar takes place only through living cells, presumably of the phloem. A quite disparate mode of conduction occurs when the growth-regulator is introduced into the transpiration stream. The latter may be carried on through nonliving regions of stem or petiole and is independent of movement of sugars."—D.B.

1532 ZIEBUR, Nancy, K., BRINK, R. A., GRAF, L. H., and STAHMANN, M.A. **The effect of casein hydrolysate on the growth *in vitro* of immature *Hordeum* embryos.** *Amer. J. Bot.* 1950, **37**, 144-8, bibl. 8.

A method is described for the aseptic cultivation of embryos of *Hordeum vulgare* var. *Chevron* on a control medium containing 2 per cent sucrose, minerals, and agar. Immature embryos grown on this medium fail to complete the later stages of normal embryonic development; instead, they germinate in 3 or 4 days to form weak seedlings. The addition of 1 per cent of casein hydrolysate to the control medium inhibits germination and prolongs embryonic growth. This response is brought about by the combined effect of amino acids, phosphate ion, and sodium chloride. The inhibition of germination is due to the high osmotic pressure of the casein hydrolysate, which is produced mainly by the sodium chloride and the amino acids. The amino acids and the phosphate of the casein hydrolysate also serve as nutrients for the embryo and increase the rate of embryonic growth. These results suggest that the continued embryonic growth of excised barley embryos is not necessarily dependent upon a specific growth requirement of the embryo, but may be the result of an interplay of both nutritional and physical factors.—Authors' summary.

1533 GUSTAFSON, F. G. **Influence of temperature on the vitamin content of green plants.** *Plant Physiol.* 1950, **25**, 150-7, bibl. 11. [Univ. Michigan, Ann Arbor]

In clover, peas, and wheat, the thiamin content was higher at 28-30°C. though the riboflavin and niacin were more abundant at the lower temperature.—From author's summary.

1534 HALL, W. C. **Growth and development of buckwheat under differential temperature gradients.** *Bot. Gaz.* 1950, **111,** 331-43, bibl. 19. [A. and M. College of Texas, College Station]

"The ontogenetic cycle of *Fagopyrum esculentum* grown under greenhouse conditions in gravel cultures maintained at uniform levels of water and nutrient supply, was traced from germination to maturity. Growth and developmental responses of plants whose roots and shoots were maintained at differential temperatures were compared with controls in which entire plants were grown under uniformly high or low temperature conditions." There were four series of plants, each grown under different temperatures: (a) shoots and roots maintained at 13°C., (b) shoots at 13°C. and roots at 21°C., (c) shoots and roots at 21°C., and (d) shoots at 21°C. and roots at 13°C. Air temperature was the major factor in determining the developmental cycle in buckwheat. "High air temperatures curtailed the vegetative phase and shortened the life-span. Anthesis occurred earlier, and maturity and senescence were rapid at higher air temperature. Leaves were numerous, but the water requirement per unit of dry weight was low. High air temperature increased accumulation of inorganic material (ash)." Low air temperature had the opposite effect.

In all four series of experiments water consumption was lowest at inception of the floral primordia and increased at time of seed formation. A balanced temperature condition (shoots and roots at the same temperature) was more conducive to normal development of buckwheat than differential root and shoot temperatures. The treatment of series (c) produced higher yields in terms of dry weight. In this annual plant, shoot temperature appears primarily to regulate development and root temperature the general growth processes.—D.B.

1535 HASKELL, G. **Studies with sweet corn. I. Cold treatment and germination.** *Plant and Soil* 1949, **2**, 49-57, bibl. 8. [John Innes Hort. Inst., Merton]

Five inbred lines of sweet corn and one hybrid dent corn were sown in soil and sand, and kept at temperatures of 50° and 40°F. for different lengths of time. The longer the seeds were kept in the cold, the greater was the number of pre-emerged seedlings killed off. Duration of low temperature and the nature of the germinating medium significantly affected final germination.—From author's summary.

1536 IWAMI, N. **Ecological studies on the common beans. I. Set of pod of several varieties in relation to temperature.** *J. hort. Assoc. Japan* 1950, **19**, 68-75. [English summary, p. 75].

Results of trials on the flowering and pod setting of ten common bean varieties showed that percentage set of pods was generally decreased by high temperatures. However, the varieties differed in this respect and it was possible to divide them into groups classified as high temperature, medium temperature and low temperature types. The varieties of low temperature type were not adapted to Tokyo conditions. A higher percentage of pod setting of the medium type was obtained by planting the seeds earlier. Varieties having the most flowers and the highest percentage of set were classified into high temperature type.—From author's summary.

1537 JOHNSTONE, G. R. **Simplified equipment for subirrigation experiments in plant nutrition.** *Plant Physiol.* 1950, **25**, 185-6. [Univ. California, Los Angeles, 7]

1538 LEVI, I., and ANDERSON, J. A. **Variations in protein contents of plants, heads, spikelets, and individual kernels of wheat.** *Canad. J. Res.* Sect. F., 1950, **28**, 71-81.

1539 LOFLAND, H. B., Jr. ***In vitro* culture of the cotton embryo.** *Bot. Gaz.* 1950, **111**, 307-11, bibl. 14. [Texas Agric. Exp. Sta., College Station]

The work was carried out to determine if the miniature embryos of *Gossypium hirsutum* could be induced to grow *in vitro* and to study the growth characteristics of these embryos. Normal embryos were excised from the seed of both field-grown and greenhouse plants of American Upland cotton. They were excised at 27-, 20-, and 15- day old stages, the ages of the embryos being known by tagging flowers at anthesis. (A technique for the removal of embryos is described.) Embryos were planted in White's routine medium which, except for the control embryos, was supplemented by vitamins, a fatty acid solution, amino acids, and various carbohydrates. The control embryos grew as well as those supplied with supplements. Embryos excised at 27 days old usually grew rapidly into normal seedlings. Embryos excised at 20 days old grew very slowly and many abnormal forms were produced. Those excised at 15 days usually failed to grow and those which did, produced small weak seedlings.—D.B.

1540 WENT, F. W. **The Earhart Plant Research Laboratory.** *Chron. Bot.* 1950, **12**, 93-107.

The Earhart Plant Research Laboratory was formally dedicated on June 7th, 1949. This paper gives a detailed description of the layout and equipment of the laboratory, which is the first built for the purpose of studying plant growth under all climatic conditions in which plant growth is possible. The factors which go to make the various climates are all controllable, simultaneously or independently. The laboratory will provide plant material for basic research of a uniformity not hitherto achieved on any considerable scale, and will make possible the assessment and precise analysis of the effect of climatic factors on plant growth, and the interaction of these factors. See also *Field Crop Abstr.* 2. Abs. 1493.—P.J.B.

MORPHOLOGY AND HISTOLOGY

1541 CORMAC, R. G. H. **A study of leaf thickness in wheat.** *Agron. J.* 1950, **42**, 361-2, bibl. 1. [Bot. Dept, Alberta Univ., Edmonton]

It was thought that a correlation might exist between leaf thickness in wheat plants and drought resistance ; the thicker the leaf, the greater the drought resistance. To provide data for possible studies along these lines, the leaf thicknesses of twenty-nine varieties of *vulgare* wheat were studied. The results are tabulated and show wide variations among varieties.—P.J.B.

1542 BURTON, D. F. **Anatomy of the cotton leaf and effects induced by 2,4-dichlorophenoxyacetic acid.** *Bot. Gaz.* 1950, **111**, 325-31, bibl. 8. [State Teachers' College, Mankato, Minn.]

A greenhouse experiment was designed to determine the histological development of the lamina of the normal leaf of *Gossypium hirsutum* and to compare the development and appearance of these leaves with those from plants treated with 2,4-D. The formation of the palisade and mesophyll layers and minor veins of normal leaves is described. " Treatment of the expanded laminae of the cotyledons of young plants with approximately 40 mg. of a 0.2 per cent concentration of 2,4-dichlorophenoxyacetic acid in lanolin inhibited activity of the marginal histogen and of the plate meristem in successively formed leaves. Major veins became fasciated. Chlorenchymatous tissue developed only in islets in the central portion of each leaf and along its margin." Leaves of cotton plants all gave uniform responses to the application of 2,4-D and all developed into strap-like forms. No signs of recovery were observed in later stages of the experiment, although cotton has been observed to recover from accidental damage by 2,4-D in the field. The amount supplied in the experiment may have been sufficient to prevent recovery, or the recovery may have been delayed beyond the period of the experiment.—D.B.

1543 SCHWARTZ, D. **The chlorophyll mutants of maize.** *Bot. Gaz.* 1949, **111**, 123-30, bibl. 26. [Univ. Illinois, Urbana]

A detailed study of the white, luteus, virescent and pale-green mutants of maize revealed that a close correlation exists between plastid size and chlorophyll development in all but the luteus plants. Abnormal plastids in the bundle-sheath cells of the mutant plants were described and were thought to result from a distention by osmosis of the semi-permeable membrane surrounding the immature plastids. All the luteus plants studied were found to contain small amounts of chlorophylls *a* and *b*. The chlorophylls were eliminated as the cause of the lethality of many pale greens, since both chlorophylls *a* and *b*, as determined by spectroscopic analysis, were found to be abundant in the lethal as well as in the viable mutants.—From author's summary.

1544 SMITH, R. B. **The role of mechanics in the evolution of the herbaceous plant stem.** *Bot. Gaz.* 1950, **111**, 262-86, bibl. 17. [Univ. Florida, Gainesville]

The investigation was concerned with the anatomical characteristics of stems and the mechanical principles involved in their structure. *Brassica kaber*, *Linum usitatissimum*, *Ricinus communis* were among the plants studied.—D.B.

ECOLOGY

1545 FINA, A. L. de, and GARBOSKY, A. J. Calculos, clave y notacion a usar en el metodo de reconocimiento de la aptitud agroecologica bgesado en cultivos indices. [**Calculations, key and notation for use in the method of recognizing agro-ecological suitability, based on indicator plants.**] *Rev. Invest. Agron. B. Aires* 1949, **3**, 276-302. [Inst. Suelos, Agrotecnia, Rep. Argentina] [Received 1950]

This abstract is reproduced in *Herbage Abstracts.* A new method of evaluating the agroecologic suitability of locality for the establishment of new types of crops is propounded. The method is based upon observations of eighteen indicator plants, twelve perennial [*Theobroma cacao*, *Anona* spp., *Musa* spp., *Citrus limon*, *Phoenix dactylifera*, *Olea europaea*, *Ficus carica*, *Vitis vinifera*, *Juglans regia*, *Prunus persica*, *Pyrus communis*, and *Pyrus malus*], and six annual [*Gossypium hirsutum*, *Citrullus vulgaris*, *Zea mays*, *Triticum aestivum*, *Avena sativa* (or *A. affinis*) and *Hordeum vulgare*], and upon the availability of irrigation. The indicator plants are observed in relation to quantity, yield, and state of maturity. A code value of 0-4 is allocated according to the observations. The figures are then used in a series of forms to calculate six basic values, from which a final classification is made. The author states that this method eliminates any necessity for observing such factors as soils, rainfall, etc. and quotes one example of five different localities with the same final classification to show that in effect analogous areas are determined by this method. This being so, any crop which grows in one locality can be successfully grown in any other of the same final classification. By January 1949 some 1200 localities, almost all in Argentina, had been recorded in this way. It is stated that, even in flat and uniform districts, the maximum radius of a ' locality ' should not exceed 20 km.—N.G.S.

1546 RAMDAS, L. A. **The micro-climates of plant communities.** *Indian Ecol.* 1946, **1**, pp. 15. [Typescript] bibl. 11, fig. 7. [Agric. Met. Sect., Met. Office, Poona] [Received 1950]

1547 INDIA, Meteorological Department. **Report on agricultural meteorology, India Meteorological Department, up to 1948.** [**n.d.**] pp. 38. appends. 11. [Mimeographed]

The report is in two parts, the first being " The progress of agricultural meteorology in India from 1932 to 1948 : a brief review," and the second " Report on agricultural meteorology for the period 1946-1948."

The appendices, some of which comprise reprints from various journals, include references to the following : keeping weekly watch on the progress of weather and crops in India ; microclimatology, thermal balance at the ground surface, turbulence in the air layers near the ground, etc ; sampling techniques for measuring growth and yield of crops ; problems of plant physiology in relation to meteorological factors.—K.O.

1548 Washington, American Institute of Crop Ecology. Int. Agro-Climatol. Ser. Study No. 10. **Ecological crop geography of Finland and its agro-climatic analogues in North America.** By *M. Y. Nuttonson*. 1950. pp. 35.

Ser. Study No. 11. **Agricultural climatology of Sweden and its agro-climatic analogues in North America.** By *M. Y. Nuttonson*, 1950. pp. 27.

Ser. Study No. 12. **Ecological crop geography of Norway and its agro-climatic analogues in North America.** By *M. Y. Nuttonson*. 1950. pp. 31.

These three studies continue the series noted in *Fld Crop Abstr*. 1. Abs. 798-903. They follow a uniform layout. There is an introduction in brief outline of the object and method of procedure. This is followed by descriptions of the general and comparative geography of the country, its climate, forests, soils and field crops. A summary of the climatic analogues is given, together with tabulated results, a map, and a bibliography.

The situation is very similar in Finland, Sweden, and Norway. The photoperiodic effects make it difficult to find compatible analogues in the United States. There are, however, off-latitude areas having the same climatic conditions, such as Idaho, Montana, Oregon and Washington, in the cases of Finland and Sweden. In Norway certain of the western areas resemble parts of Washington, while the conditions in east Norway suggest those of Montana. Although these off-latitude analogues are of limited value for direct crop introduction, it is suggested that the existence of considerable similarity in climatic conditions of regions of differing latitude demands further attention. The winters in the countries considered are much milder than those in the equivalent latitudes of North America. Thus most of the agroclimatic analogues are only appropriate for spring-sown crop conditions, although year-round analogues are offered in the case of Sweden and Norway. Latitudinal and thermal analogues are noted as follows. For Finland: areas of Alaska, North-west Territories, British Columbia, Alberta and Saskatchewan. For Sweden: the same, with the addition of parts of Yukon and Quebec. For Norway: areas in Alaska, Northwest Territories, Yukon, British Columbia, Alberta and Labrador. The location of these is shown in maps. It is stressed that the information and conclusions arrived at merely demonstrate the possibilities; many of the comparative analogues are in no way identical, and the meteorological data are micro-climatic in character.—N.G.S.

1549 Australia, Department of Economics. Univerisity of W. Australia. Res. Rep. No. 6. **Climate of the Lake Victoria plateau. [E. Africa].** By *L. Fenton*. 1949, pp. 11, maps 4. [Mimeographed] [Geog. Lab. Univ. West. Aust., Nedlands]

The area reported on includes all of Uganda, western Kenya, and northern Tanganyika. Most of the area lies within the Lake Plateau Basin, which is one of the two sources of the Nile.—K.O.

1550 Prescott, J. A., and Taylor, J. K. **Recent progress in the classification and mapping of soils and soil resources in Australia.** *Aust. J. Sci*. 1949, **12**, 92-6, bibl. 46.

TAXONOMY

1551 Rickett, H. W., *et al.* **The conservation of species names.** *Bot. Notiser* 1950, No. 2, 328-47.

The paper consists of a symposium of the views of a number of prominent botanists on the question of the rules governing the conservation of species names.—P.J.B.

1552 Žukovskiĭ, P. M. [**Species composition and a new species of wheat.**] [Russian] *Doklady Akad. Nauk SSSR* 1949, **69**, 261-3. [Timirjazev Agric. Akad., Moscow]

A description is given of a new wheat species *Triticum amplissifolium* Zhuk. Its leaf blade is very wide (3-5 cm.) and its spikelets are many flowered (5-6). The grain is almost spherical with a deep furrow. The species is hexaploid, and is not resistant to *Erysiphe graminis* DC. *f. tritici*. It is cultivated in China.—R.P.J.

1553 Forlani, R. Un ibrido di *Aegilops ovata* × *Secale cereale*. [**A hybrid of *Aegilops ovata* × *Secale cereale*.**] *Ann. Sper. agr.* 1950, **4**, 561-7. [English summary, p. 566], bibl. 9.

1554 Scossiroli, R. Contributo alla conoscenza del mais (*Zea mays*). Descrizione tassonomica. [**Contribution to the knowledge of maize (*Zea mays*). A taxonomic description.**] *Suppl. to Ann. Sper. agr.* 1950, **4**, 1-34. [English summary, p. 31)], bibl. 49, [Sta. sper. Maiscoltura, Bergamo, Italy]

The introduction explains the statistical method employed and summarizes our present knowledge of the origin of maize. The characters of maize which have previously been considered in systematic studies are critically examined. A list is given of the characters which the author considers suitable for use in describing the numerous maize varieties grown in Italy. The biometrical data obtained from the examination of a hundred plants of the variety Giallo tondo San Pancrazio are given.—E.B.

1555 CHATTERJEE, D. **A modified key and enumeration of the species of *Oryza* Linn.** *Indian J. agric. Sci.* 1948, **28**, 185-92, bibl. 21. [Received 1950] [Royal Botanic Gardens, Kew]

1556 BAWKHER, A. M. **Botanical nomenclature of the cultivated oil-bearing *Brassica* species. (Mustard, rape and colza).** *Co-oper. Market Rev.* 1950, **4**, 220-5, bibl. 3. [Co-oper. Market Dept, Govt. Pakistan, Karachi]

This is an attempt to clear up the present confusion in the Indian nomenclature of brassica oilseeds. A table is given identifying the Indian, English, and botanical names. Colza is identified as *Brassica trilocularis* (yellow seeded) and *B. campestris campestris* var. *dichotoma* (brown seeded); Rape as *B. campestris napus* var. *toria*. Three types of mustard are recognized; *B. juncea*, *B. tournifortii*, and *B. nigra*.—N.G.S.

1557 COVAS, G. **Taxonomic observations on the north American species of *Hordeum*.** *Madroño* 1949, **10**. 1-21.

BOOKS AND PERIODICALS

1558 SOUTH ASIA, Science Co-operation Office for South Asia. **Bibliography of scientific publications of South Asia (India, Burma, Ceylon).** No. 1. 1949, UNESCO, Delhi, 1949, pp. 107. [Mimeographed]

1559 COMMONWEALTH AGRICULTURAL BUREAUX EXECUTIVE COUNCIL. **List of research workers agriculture and forestry in the British Commonwealth 1950. (Including the list of such workers in the Republic of Ireland).** 25 × 16. pp. 422. Aberystwyth: Cambrian News Ltd. 1950. 10s. 6d.

1560 LAND OF BRITAIN (The). **The Channel Islands.** By *G. Dury*, 28 × 22, pp. 54, London: Survey by Geographical Publications Ltd. 1950.

1561 EGUIRAUN, J. de Compendio de agricultura. [**Compendium of agriculture.**] 23 × 16. pp. xvi + 151, illus. Caracas: Tipografia Garrido. 1948. [Ministerio de Agricultura y Cria, Venezuela]

1562 GILBERT, F. A. **Mineral nutrition of plants and animals.** 22 × 14. pp. xii + 131, illus. 31. London: Hutchinson's Scientific and Technical Publications. 1950. 12s. 6d.

This valuable book contains much abstracted information upon twenty-one elements, marshalled together in an orderly fashion. The reader is presented with a wide survey of the whole field, the student with an admirable text book, and the scientific worker with a handy reference and an extensive bibliography. It is fortunate that the illustrations are not important to the text, since the litho-offset process used quite obviously does not lend itself to the good reproduction of photographs.—N. G. Shreeve.

1563 HAWKINS, J. C. **The mechanical equipment of farms.** 22 × 15. pp. xv + 418. figs 126. London: Farmer and Stock-Breeder Ltd. 1949. 21s.

The latest research progress in agricultural engineering, which should be of great practical importance to farmer and student, is described. The author concentrates more on the comparative merits of different machines, indicating their suitability for each job and how they should be cared for, rather than on giving details of their construction.

Tables, illustrations and a bibliography are included.—S. Davies.

REPORTS

1564 GREAT BRITAIN. Edinburgh and East of Scotland College of Agriculture. Report on the work of the College for the year ending 30th Sept., 1949. Edinburgh, 1950, pp. 102. [See *Herb. Abstr.* 20, Abs. 660.]

INVESTIGATIONS REPORTED:

NITROGENOUS TOP DRESSINGS, FIELD BEANS.

These did not increase yield. (p. 26).

HORMONE WEED-KILLERS, CEREAL CROPS.

The sodium salt and an amine of 2,4-D killed charlock (*Brassica* sp.) and checked fat hen (*Chenopodium album*), black bindweed (*Polygonum* sp.), redshank and knotgrass (*Polygonum* spp.). In one case barley showed slight ear distortion and some unfilled grains. In another trial Agroxone (MCPA) and Weedone (ethyl 2,4-D) were used at three rates on docks (*Rumex* sp.). Agroxone spray was ineffective except at the rate of 2 gal. per 100 gal. water per acre, and even at this rate it was less effective than Weedone. As a dust, Agroxone at 4 cwt. per acre was more effective than Weedone at 2 cwt. Weedone at 3 or 4 cwt. gave best results, but regeneration was such that dusting had to be repeated 3 months later. (pp. 33-4).

EFFECT OF *Puccinia graminis avenae* ON THE YIELD, PERCENTAGE KERNEL, ETC. OF OATS (p. 34).

STRANGLES IN SUGAR BEET.

In a survey of this disease no fungus was found to which the damage could be attributed. (pp. 34-5).

SAND AND SOIL CULTURE EXPERIMENTS.

Investigations are in progress on manganese deficiency and grey speck in oats. (pp. 44 and 49).

EFFECT OF VARIETY AND NITROGENOUS MANURING ON OIL PERCENTAGE AND IODINE VALUES OF LINSEED.

Oil percentages were: Royal 39.3, Bison 38.9, Redwing 35.7. Iodine values were: Royal 190, Bison 193, Redwing 193. Nitrogen had no effect (p. 49).

OXALIC ACID IN FRESH SUGAR BEET TOPS.

This is said to cause scouring and is to be investigated. (p. 50).—C.W.S.H.

1565 GREAT BRITAIN. Scottish Society for Research in Plant-breeding. Report by the Directors and Report by the Director of Research to the Annual General Meeting, 27th July, 1950. Edinburgh, 1950, pp. 55. [See *Herb. Abstr.* 20. Abs. 661.]

INVESTIGATIONS REPORTED:

OAT BREEDING:

The variety "Craigs Afterlea" has combined strong straw with early ripening though the latter character is not obtained without some sacrifice of yield. This variety is expected to be available in 1951. A reselection of "Craigs Afterlea" and another new variety of the same maturity-height class promise to give higher yields. Breeding is being undertaken for the production of varieties suited to northern and upland soils, varieties which will not sprout in the stook and varieties suited to alkaline soils. Hybrid selections have been classified according to height of straw and time of maturation and forty-five of these are being compared in a replicated variety trial with standard varieties. Sun II. (AY) was the outstanding variety in yield but was later-maturing. (pp. 5-11).

BARLEY BREEDING:

Breeding for prompt germination was continued. The characteristics of some huskless varieties are being investigated as these may be useful for pearl barley, also pig and poultry feeding. (pp. 11-2).

FIELD BEANS:

Selection for earliness and attractive shape and size of bean was continued. It was shown that spatial isolation at a distance of 300 yd. from another bean crop was insufficient to prevent contamination by cross-pollination. (pp. 12-3).

SUGAR BEET:

Selection was directed to the production of non-bolting varieties for early sowing and of heavy cropping varieties for shallow soils of medium fertility. For the latter purpose fodder beet varieties were compared as sugar producers with true sugar beets and with mangolds. Although the fodder beets as a whole outyielded the sugar beets in sugar production the individual sugar beet variety Klein E was the highest yielding of all varieties, and it was not therefore considered that the use of fodder beets as sugar producers would gain any support. (pp. 30-1).

FODDER BEET AND MANGOLDS:

In the above trial fodder production showed higher dry matter yields from mangolds in October 1948, but higher yields from fodder beet in December, 1949. Top weights of fodder beet were lower than those of sugar beet, but some varieties yielded more than the Klein E sugar beet variety. Mangolds bolted badly. (p. 31).—C.W.S.H.

1566 GREAT BRITAIN. Rothamsted Experimental Station, Harpenden. Results of the Field Experiments, 1948. [Mimeographed]. Pages not numbered. Price 5/-.

The work comprises information of the type contained in the appendices to the Annual Reports of the Station published before the war. The data include results from classical tests (wheat, barley, wheat after fallow, mangolds, hay and rotations) and also from long-term and short-term experiments of the usual type.—M.H.

1567 GREAT BRITAIN, PETERBOROUGH. British Sugar Corporaton. Report on mechanization of the sugar beet crop in Great Britain during the year 1949. Peterborough, 1950, pp. 16.

The report gives data on various aspects of the mechanized harvesting of sugar beet. It clearly indicates the exceptional progress in the mechanization of the 1949 harvest. Of a total of approximately 400,000 acres of sugar beet grown in 1948 and 1949, 13,676 and 43,368 acres respectively were harvested mechanically, being 3.4 per cent and 10.8 per cent of the total acreage in each year.—P.J.B.

1568 ÉIRE, Department of Agriculture. Field experiments, 1948. *J. Dep. Agric. Éire* 1949, **46**, 131-48.

In continued wheat variety trials with Atle and Progress, the latter was superior. In barley variety trials, Ymer and Freja produced very short straw, and good quality grain. Trials with gammexane dust for the control of wireworms and leather jackets continued. The results were inconclusive. Trials with 4- chloro- 2 methyl phenoyaxcetic acid showed that *Brassica* species are controlled by concentrations as low as 0.5 per cent. Results with other weed species varied. Coltsfoot, bishopweed, comfrey, cleavers and corn marigold were particularly resistant. Greater control was obtained by using strengths of 3 and 4 per cent, and while this caused a check to cereals, the effect was not sufficient to preclude the use of the spray at these concentrations.—N.G.S.

1569 CYPRUS. Annual Report of the Department of Agriculture for the year 1949. By *P. C. Chambers*. 1950, pp. 16.

The year's agriculture is reviewed. Testing of local varieties of wheat continued. A local variety of linseed showed an increased yield of 80 per cent over two imported varieties of high yielding repute, in three trials. 2,4-D proved more effective against local weed flora than MCPA. See also *Herb. Abstr.* 14. Abs. 1811, and 17, Abs. 565.—N.G.S.

1570 MALTA. Report on the working of the Department of Agriculture during October, 1938 to September, 1946, and the Agricultural Year 1946-47. Malta, 1949, pp. 155.

A review of the agriculture of Malta under war conditions, and in the subsequent year. The first section is mainly occupied with an account of the great difficulties experienced during the war, and the legislation enacted. The first year of peace brought an unfortunate recurrence of the third dry winter in succession. During the war it was found impossible to import adequate stocks of seed and out of efforts to grow seed locally has grown a scheme to develop a seed-growing industry. Experience showed that Malta was ideally suited for this. Tables of statistics are followed by appendices consisting of reports.—N.G.S.

1571 RHODESIA Agricultural Experiment Station, Salisbury. Annual Report of experiments, season 1948-49. By *A. G. H. Rattray*. *Rhod. agric. J.* 1950, 47, 126-51.

A brief review of the conditions during the year is followed by reports on various experiments.

CROP ROTATION EXPERIMENTS :

Maize was grown continually with applications of phosphate and compared with maize receiving similar treatment, but with a green-manure crop grown every 3rd year. The value of the green-manure (not specified) was such that a greater total yield of maize was obtained over 21 years, although in 8 of these the land was unproductive, than from the maize grown continually for the same period without a green-manure crop. Results from a further set of trials indicated that phosphates are more beneficial where there is a better supply of organic matter. A three-course rotation of maize/velvet beans (*Mucuna* sp.) for seed/oats resulted in increased maize yields.

MAIZE ROTATION EXPERIMENTS :

Fourteen different rotations were practised. Tabulated results are presented. A green-manure crop appears to be of at least equal value to maize as 4 tons of compost per acre.

COMPARISON OF CROPS FOR GREEN MANURE :

Selected crops were ploughed in and followed by maize which gave the following yields per acre : after velvet beans, 4020 lb ; after sunn hemp 3420 lb. ; after Dhal (*Cajanus indicus*) 3120 lb. ; after munga 2560 lb. ; and after Sudan grass 1840 lb. The maize after Sudan grass and munga appeared to suffer from nitrogen starvation. The sunn hemp occupied the ground for 6 weeks less than the velvet beans.

MAIZE BREEDING :

Over fifty inbred strains of white varieties were replanted for further inbreeding. Trials of hybrid strains were carried out at Salisbury, Bulawayo, and Gatooma. Tabulated results of these are given.

SUNFLOWER VARIETY TRIAL :

The following yields were obtained per acre : Mars, 1462.5 lb. ; Pole Star, 1237.5 lb. ; Southern Cross, 1173 lb ; Jupiter, 1075 lb.

The following experiments are also reported : spacing trials for maize and soybeans ; experiments with N and P fertilizers for maize, and a comparison of the oil and protein yields of soybeans and groundnuts.—N.G.S.

1572 EAST AFRICA. Annual Report of the East African Agriculture and Forestry Research Organisation, 1949, Nairobi, pp. 44.

Breeding for resistance to virus diseases in cassava, groundnuts and maize continued. Work also continued on the nutrition of maize in sand culture : the NP balance was the dominant factor and information is given concerning the uptakes and effects. Investigations on climatic data in relation to agriculture continued. The first stage of the enquiry, on the estimation of incoming solar radiation from air-temperature observations, was completed. The next stage is to compare the results with measurements of soil moisture and to analyse the rainfall records. The results of this research will be incorporated into the necessary formulae for computing the balance between evaporation and rainfall, or soil moisture and rainfall, whichever proves the more practical, and zonal areas will be demarcated.—N.G.S.

1573 Uganda Protectorate. Annual Report of the Department of Agriculture for the period 1st April, 1946—31st March, 1947. Part I. Administrative, pp. 44. Part II. Experimental, pp. 89.

See also *Herb. Abstr.* 18. Abs. 556 and *Fld Crop Abstr.* 1, Abs. 910. Part I is an economic review of the year's agriculture: Part II covers experimental work. Various cotton sowing-date trials are reported, the results of which showed that earlier planting gives the greatest expectation of reasonably high yields. B 181 cotton appears to have no advantage over BP 52, apart from its resistance to *B. malvacearum*, except under relatively high fertility conditions. Tabulated results for fertilizer trials with cotton, groundnuts and *Eleusine* are given. The following bean varieties were considered the most promising: Mutike 4, Banja, Bukalasa No. 2, White Kidney, Abundance, Tepary, Mixed Mutike, Kagi, Kainja No. 1, Maguluganamunye, and Namunye. The Serere fertility experiment completed a 10-year cycle. This showed that 2-years' cropping followed by 3-years' resting and 3-years' cropping followed by 2-years' resting, gave much higher yields than 4-years' cropping followed by 1-year's resting. It was demonstrated that the grazing of leys does not reduce the yield of subsequent crops.—N.G.S.

1574 Kenya, Department of Agriculture. Annual Report 1947. Nairobi, 1949, pp. 194.

See *Herb. Abstr.* 18. Abs. 884 and next abs. It was found that where straw was burnt, subsequent yields were higher than when it was ploughed in. 1 lb. pyrethrum powder per bag of 200 lb. gave complete protection to grain in storage. 52 BHC dust at 40 lb. per acre controlled sawfly on *Brassica* spp. Cereal breeding continued on a wide scale. New wheats continued to be produced and multiplied, and one, 294.M.7.L.6.A. (Australian 26.A × 117.A.) was released generally. Yields of some of the newer wheat hybrids are tabulated for comparison. Details are given of the wheat, barley and oat breeding programmes.—N.G.S.

1575 Kenya, Department of Agriculture. Annual Report 1948. Nairobi, 1950, pp. 228.

See *Field Crop Abstr.* 3, 1574. The previous year's work was continued. The following wheats were released: 318.A.J.4.A.1., 261.R.7.C.I.B., 117.A.II. and Rhodesian Sabanero. Two barleys, Research and Glacier, were also released. It was shown that wheat yielded twice as much following pyrethrum as following *Bromus*. Chloroxone liquid gave satisfactory control of the weeds *Spergula arvensis*, *Datura stramonium*, *Tagetes minuta*, and *Bidens pilosa*, when applied at 2 lb. of the active ingredient per acre, but at this rate it is uneconomic. It is noted that the two noxious weeds, *Datura stramonium*, and *Lolium temulentum* are on the increase in all areas.—N.G.S.

1576 Belgian Congo. Rapport Annuel pour l'Exercice 1948. [Annual Report for the financial year 1948.] *Publ. Inst. Nat. Étude Agron. Congo Belge* 1949, pp. 290 + vi.

Investigations reported:

The more important items are abstracted elsewhere in this issue; see references below.

Optimum sowing dates of annual food plants; pp. 55-6.
Conservation of seed at Gandajika; pp. 72-3, Abs. 1577.
Cultivation of food crops in the Iles du Fleuve; p. 107.
Rotation and fallow trials; pp. 169-70, 198, 241.
High altitude trials (2000 m.); p. 199, Abs. 1578.

Cotton:
Control of *Helopeltis bergrothi*; pp. 67-70, Abs. 1577.
Control of *Lygus*; pp. 73-4, Abs. 1577.
Resistance to "wilt"; p. 230, Abs. 1580.
Comparative yield trials; pp. 226-30, 231, 235, 240-1, 245-8, 249-51, 264-6, Abs. 1580.
Effect of ecological conditions; p. 232.
"Topping" trial; p. 232-3. Abs. 1580.
Effects of soil cover; pp. 235-6, 241-2.
Place in rotation; p. 236, 242.
Yield of previous crop and its effect; pp. 236-7, 242-3.
Methods of cultivating; p. 241.
Germination of seed; p. 243; Abs. 1580.
Transplanting trials; pp. 251-2, Abs. 1580.

Maize:
Comparative and yield trials; pp. 108-9, 255-7, 267, 277, 280, 284, Abs. 1582.
Protection of seedlings; p. 74.
Selection; pp. 164-5, Abs. 1578.
Breeding pure lines; pp. 253-5, Abs. 1580.
Regression of yields due to continuous cultivation; p. 257.

Inter-row cultivation trials. *Phaseolus aureus/Ph. angularis* with maize and cotton; pp. 261-2.

Spacing and seed-rate trials. *Phaseolus* sp.; p. 262.

Comparative and yield trials of:

Coix lachryma-jobi, p. 108; *Oryza sativa*, pp. 109-111, 263, Abs. 1580; *Arachis hypogaea*, pp. 111-2, 258-9, 267, 276, 280, Abs. 1580, 1581 and 1582; *Phaseolus* spp., pp. 112, 166, 196, 280, Abs. 1578; *Glycine hispida*, pp. 113-4, 166-7, 277, 280, Abs. 1582; *Dioscorea*, pp. 113-4; *Manihot utilissima*, pp. 114-5, 165, 197, 260-1, 267, 277, Abs. 1578; *Sorghum*, pp. 167, 280; *Eleusine*, p. 167; *Urena lobata*, pp. 220-22, Abs. 1579; Millet, p. 276; *Voandzeia subterranea*, p. 277; *Vigna*, p. 277; *Telfairia pedata*, p. 278; *Sechium edule*, p. 278; *Helianthus annuus*, p. 280.

A list of publications by INEAC is appended.—N.G.S.

1577 **Belgian Congo**, Yangambi Research Centre. Rapport Annuel pour l'Exercice 1948. [Annual report for the financial year 1948.] *Publ. Inst. Nat. Étude Agron. Congo Belge* 1949, pp. 9-119.

The full INEAC annual report, of which the above is part, is summarized in Abstract 1576.

An experiment was carried out at Gandajika to determine the minimum single dressings of Gésarol and Gammexane required to conserve maize seed in sacks for one year. This was found to be 1 part in 2000 of 10 per cent DDT powder. Maize, groundnuts and sorghum were treated (in metal boxes) with dressings of 1 part per 1000 of Geigy 33, Gésarol and Gammexane. Gammexane gave the best results, and was the only treatment effective with maize. In experiments on the control of *Helopeltis bergrothi* on cotton, at Bambesa, DDT was the only effective insecticide. At Gandajika, *Lygus* attack on cotton was controlled with 10 per cent Gésarol powder and 10 per cent DDT. Corbovit and Corbixol seemed to give protection to maize seedlings from birds and rodents, and to increase the power of germination.—N.G.S.

1578 **Belgian Congo**. Secteur de L'Est. Rapport Annuel pour l'Exercice 1948. [Annual report for the financial year 1948.] *Publ. Inst. Nat. Étude. Agron. Congo Belge* 1949, pp. 155-200.

This is part of the INEAC annual report summarized in Abstract 1576.

Twenty-four crop plants were tried at a height of 2000 m. at Mulungu-Tshibinda. Excellent results were obtained with *Guizotia abyssinica*, amongst others. In maize trials excellent results were reported from the precocious varieties coming from Rubona and Kisozi. Red maize (Golden Corn) proved to be earlier than the indigenous white maize. The red variety Rixensart No. 33 was especially precocious, but its yield was poor. It will be used in crossing. Trials of *Manihot* at Mulungu-Tshibinda showed the varieties N'tolili and Rubona to be the heaviest yielders. Tabulated results of variety trials of *Phaseolus vulgaris* at Nioka and Mulungu-Tshibinda are given. The soybean varieties Herman and Otootan yielded best at Nioka.—N.G.S.

1579 **Belgian Congo**. Secteur du Bas-Congo. Rapport Annuel pour l'Exercice 1948., [Annual report for the financial year 1948.] *Publ. Inst. Nat. Étude Agron. Congo Belge* 1949, pp. 201-26.

This is part of the INEAC annual report summarized in Abstract No. 1576. The following six lines of *Urena lobata* were significantly above standard : S.C.E.7, S.C.V.125, S.C.V.14, S.C.V.117, 4.26, and M.71. Yields are given of a rotation in being from 1945-1948 (inclusive) in which *U. lobata* was introduced.—N.G.S.

1580 **Belgian Congo**. Service de Sélection et d'Expérimentation Cotonniéres. Rapport Annuel pour l'Exercice 1948. [Annual report for the financial year 1948.] *Publ. Inst. Nat. Étude Agron. Congo Belge* 1949, pp. 225-68.

This is part of the INEAC annual report summarized in Abstract 1576.

Cotton :

At Bambesa, the lines Stoneville 5/90, Stoneville 2/180, and Stoneville 5/B were selected as the best in a series of trials. It is proposed to use the last two to improve length of fibre and resistance to wilt. In a further set of comparative soil and sowing-date trials, Stoneville 0/4 promised well. At Gandajika, some 424 lines of cotton were observed. In comparative trials, GAR varieties, with the exception of GAR 86, proved superior to Triumph. The variety 1103-1014-605 gave the highest yield in a further series of trials. The characteristics of thirteen groups, out of 1700 lines at Lubarika, are tabulated. It was shown that a 30 per cent reduction in yield resulted from sowing cotton on 14 Feb. instead of on the normal date (7 Jan.). It was shown at Bambesa that topping of the terminal buds of cotton had no significant effect upon the yield, length of fibre, percentage fibre, seed-index or quality of cotton, but that topping on the 50th day after sowing tended to prolong the vegetative period. Trials at Bambesa gave the following results. Varieties resistant to wilt ; GAR 32, and GAR 37. Varieties fairly resistant to wilt ; Delta S.M., and GAR 33/22. Varieties susceptible to wilt ; 1103, 1105, H 62 and A/16. Germination tests at Boketa showed that germination is satisfactory from April to August, after which the sowing season normally ends, but is poor in September and October. It was shown at Gandajika that transplanting diminished yields.

Maize :

Four pure lines of maize were shown to give high yields : 12/E/B/D/32 ; 159/9/A/J/201/181/165 ; 109/A/221/231/211/193 ; and 130/A/G/332.

Groundnuts :

The variety Gemena 1006. 77/157 gave the best results in trials.

Rice :

At Gandajika, the following varieties gave the highest yields : Kisantu hill rice 2.353 kg./ha. ; Losa lua Mponde 1.957 kg./ha. and Osumbu 1.945 kg./ha.—N.G.S.

1581 **Belgian Congo**. Secteur du Katanga. Rapport Annuel pour l'Exercice 1948. [Annual report for the financial year 1948.] *Publ. Inst. Nat. Étude Agron. Congo Belge* 1949, pp. 269-78.

This is part of the INEAC annual report summarized in Abstract No. 1576. At Kiyaka, the highest yielding varieties of groundnuts were :

Nguba (local); Mukongo (local); and Mukongo Muboma. The most productive improved maize hybrid from Gandajika was 391 × 351.F.1.—N.G.S.

1582 BELGIAN CONGO. Stations du Ruanda-Urundi. Rapport Annuel pour l'Exercice 1948. [Annual report for the financial year 1948.] *Publ. Inst. Nat. Étude Agron. Congo Belge* 1949, pp. 279-86.

This is part of the INEAC annual report summarized in Abstract No. 1576. At Rubona, the following varieties gave the best results. MAIZE: Golden Corn 034 and Rubona in the first season; Rubona hybrid, Plata jaune Yangambi, and Kisozi 1946 in the second season. GROUNDNUTS: Mputu A, 0574, Sénégal and Kiehusa from Yangambi; Kigan and A.26 from Gandajika. SORGHUM: Rudasakwa 015, Amagunu and Nkonkoma 020. SOYBEAN: Dixie, Emperor, Nanda, Dunfield, Easy Cook and Jogun. SUNFLOWER: Szabolezi Cirmos, Odry Fele and Mauthner Fekete.—N.G.S.

1583 NYASALAND PROTECTORATE. Report for the Department of Agriculture for the year 1947. Part II. Experimental Work. Zomba, 1948, pp. 15.

Results from an interplanting experiment have indicated that interplanting maize with sesame might be an economic proposition. Where maize and groundnuts were interplanted the results were inconclusive. In an experiment on the effect of composts on sorghum yields it is suggested that the failure of composts to improve yields was due to the long exposure of the composted refuse prior to application.—N.G.S.

1584 NIGERIA. Annual Report on the Agricultural Department for the year 1947. Lagos, 1949, pp. 83.

See also *Herb. Abstr.* 15, Abs. 841, 17, Abs. 566, and next abstract. Groundnut variety trials continued, the strain K. 38 being most promising. Selection work on cotton was carried out, particularly with the strain 26C, and Improved Ishan. —N.G.S.

1585 NIGERIA. Annual Report on the Agricultural Department for the year 1948. Lagos, 1949. pp. 75.

See Abs. 1584. Trial plots of linseed were laid down to see if this crop was suitable for cultivation in the E. Provinces. The Gold Coast cassava variety G.C. 997B was outstanding in yield trials. In cotton variety trials U.A.7-44 was the most successful. DDT was successfully used to control *Helopeltis sanguineus* on cotton. The results of groundnut variety trials are tabulated. Groundnut seed dressing trials were initiated. The effectiveness of phosphates for groundnuts was demonstrated, an increase of 539 lb. of kernels per acre being obtained at Kontagora in response to 50 lb. per ac. of superphosphate. Three newly imported soybean varieties, Avoyelles, Acadian, and Mamloxi, promised well in preliminary trials. Selection work on sunflowers was begun.—N.G.S.

1586 SIERRA LEONE, Colony of. Annual Report of the Department of Agriculture for the year 1948. Freetown, 1949, pp. 51.

At Makeni experimental station D.C. 39, gave the highest yield of six swamp rices grown. The British Guiana rices No. 79, D. 99., and D.114, all gave above average yields, and are likely to be popular amongst local farmers on account of their short growing seasons. Coco and Biriwa are the best cassava varieties. Pigeon pea is expanding as a crop, and five varieties are under trial. Experiments with bush burning showed that bush burned *in situ* gave higher subsequent yields of rice. Weed growth was less after burning and it is suggested that the heat of the burn was sufficient to reduce the number of viable indigenous weed seeds. Experiments were also carried out on the effect of fertilizers on root and cereal crops.—N.G.S.

1587 INDIA. Indian Agricultural Research Institute, New Delhi. Scientific reports for the year ended 30th June, 1946. Delhi, 1946. [Received 1948]

See also *Herb. Abstr.* 17. Abs. 1253. In the Agronomy Department, work continued on the relative values of N_2 in green manures, farmyard manure, compost, oil cake and ammonium sulphate. The effect of liming some plots did not counteract the adverse effects of excess K_2O in the soil, nor did it increase the effectiveness of available minor elements. The striking effect of P_2O_5 on yields when applied to legumes in increasing their P_2O_5 and Ca content and in developing a stable soil fertility for the following crops has been well established by experiments. Manurial trials testing the possible use of TNT as a fertilizer showed it to be as efficient as ammonium sulphate. Experiments on the effect of green-manure crops (cowpeas and sunnhemp) and irrigation on the yield of wheat and rabi are continuing. Work at the Agricultural Substation at Karnal was restricted but some experiments on the manuring of different crops in rotation have continued. The Botany Division continued its work on the improvement of Indian wheat. The F_6 generation of the intergeneric hybrids, *Triticum vulgare* × *Secale cereale* and *T. vulgare* × *Aegilops caudata* produced high tillering plants with long ears, coloured amber and red, and well-filled grain, resistant to smut. Experiments on breeding other smut- and rust-resistant wheat varieties were continued. Other schemes in progress are: breeding for resistance to wilt in pigeon pea (*Cajanus cajan*) and resistance to rust in *Linum usitatissimum*; cytogenetical studies on the Brassicae and other crop plants; and investigations into the drought resistance of wheat.—K.O.

1588 CANADA, Department of Agriculture. Division of Field Husbandry, Central Experimental Farm, Ottawa. Progress Report 1936-1948, 1950, pp. 125.

The Crop Sequence section reports data of the effect of different preceding crops and summer fallow on the yields of rye, oats and maize at Ottawa. From the results, it is concluded that summer fallowing is not an advisable practice for eastern Canada. In trials to compare the value of alfalfa, red clover and *Poa pratensis* as preceding crops on the yields of barley, oats and maize, the superior value of the legumes was demonstrated; alfalfa resulted in higher grain yields than red clover. Data of greenhouse tests on the comparative value of oats, *P. pratensis* and alfalfa as preceding crops for oats on eleven soil types in Carleton County, Ontario, are reported. The Cultural Experiments section reports data of the effect of depth of ploughing with disc and mouldboard ploughs on the yield of barley, oats and corn on loam and clay soils. Results showed that there was very little difference in yield between disc and mouldboard ploughing and that ploughing deeper than 4 in. was unnecessary from the standpoint of yield. Rate of seeding trials with maize, *Fagopyrum esculentum*, barley and oats are noted. In seeding method trials with barley and wheat, 7 in. wide drills gave the highest yields. Drilling barley at 3 bu. per ac. and oats at 3.75 bu. per ac. both ways, raised subsequent grain yields 6.3 and 6.6 bu. per ac., respectively, as compared with normal one-way drillings. Data of depth seeding trials with oats, barley, wheat, maize and mangolds are reported and contour and strip cropping investigations briefly noted. Trials to determine the effect of surface soil removal on the yield of barley grown with and without a chemical fertilizer are reported. The Weed Control section reports 3-year averages of the reduction in grain yield by perennial weeds. Tables give details of the germination of weed seeds at various soil depths and the germination of weed seeds buried 18 in. deep in soil, over a 5-year period. All the weeds listed showed a tendency to become dormant on being deeply buried; few wild oat (*Avena fatua*) seeds survived 3-years' deep burial. A table gives data of the number of days required to kill perennial weeds by the removal of top growth. Brief notes are given of chemical weed control with copper sulphate, cyanamide, Sinox and 2,4-D. An appendix contains a list of experimental projects in progress under the Division of Field Husbandry, Soils and Agricultural Engineering.—P.J.B.

1589 CANADA, Department of Agriculture, Swift Current Dominion Experimental Station. Progress Report 1937-47, Ottawa, 1949, pp. 116.

The respective merits of several types of crop rotation have been compared for conditions in south-western Saskatchewan. Over a 10-year-period, the highest average wheat yields were produced by continuous cropping, though crop failures were fairly frequent. Results showed that there was no standard rotation that could be consistently followed to give maximum returns. A more practical solution was to base the cropping plan on the basis of depth of moisture in the soil at seeding time. Four years' trials show that the chances of getting a paying wheat crop are proportional to the depth of moist soil at seeding time, particularly on stubble land. Further trials showed that the earlier fallowing operations were begun, the greater was the amount of soil moisture conserved. The results of trials to determine the effect of date of seeding on yields of wheat, oats and barley on fallow and on stubble and the relative yields of wheat, oats and barley on fallow are reported. Preliminary experiments on weed control with 2,4-D in wheat and flax show that 2,4-D is no substitute for good tillage practices. Studies on the drought- and insect-resistance of wheat are reported. The spring-wheat breeding programme has concentrated on sawfly (*Cephus cinctus*) resistance; the sawfly resistant variety Rescue has been produced and further work is in progress to improve its other characteristics. Work is in progress on crosses of Titan × Glacier barley to produce a variety superior to Prospect. A number of the leading wheat, oat, barley, rye and flax varieties have been studied over the 10-year period and their characteristics are briefly summarized and compared.—P.J.B.

1590 CANADA, Department of Agriculture, Regina, Dominion Experimental Substation. Progress Report 1937-46. Ottawa, 1949, pp. 31.

In order to determine the best tillage and cropping practices to control soil drifting on Regina heavy clay soils, a number of experiments have been carried out over the review period. They include summer fallowing methods, methods of spring preparation for summer fallow, crop rotations, optimum cover crop seeding dates on summer fallow, the effect of different crop rotations on the susceptibility of soils to drifting, the relative value of cereal crops for cover crops, the value of spreading straw and the relative value of strip farming. The results of these experiments are briefly summarized. The results of studies to determine the effect of cereal and flax crops on succeeding crop yields over the period 1937-46, are reported. The majority of weed control experiments have been directed against wild mustard (*Sinapis* spp.) The results reported include the effect of crop rotation, summer fallowing methods, different annual grain and forage crops, harrowing after seeding, and rate, date and depth of seeding on the prevalence of wild mustard. In chemical control trials reported, wild mustard and stinkweed (*Datura stramonium*) were completely controlled in crops by spraying with 500 cc. of 2,4-D amine salt per acre. Data are reported of trials to determine the effect on wheat yield of fertilizers applied on summer fallow and stubble.—P.J.B.

1591 ONTARIO, Department of Agriculture. Report of the Minister of Agriculture for 1948-49. Toronto, 1949, pp. 208.

The Western Ontario Experimental Farm reports an extensive experiment on the control of weeds by 2,4-D and the effect of 2,4-D, when used for weed control, on sixty-four varieties of hybrid maize. A list of recommendations regarding the use of 2,4-D for weed control in maize was drawn up. Post-emergence spraying of maize when 6 in. high with 0.5 lb. per acre of the sodium or amine salt, or 0.25 lb. of the ester, of 2,4-D economically controlled all annual weeds, including grasses; perennial weeds, though not killed, were damaged and rarely set seed. There was a wide variation in the response of 2,4-D of the sixty-four varieties of hybrid maize tested, but none showed a significant reduction in grain yield following 2,4-D spraying when 6 in. high. Pre-emergence sprays were uneconomic. The 79th Annual Report of the Entomological Society (embodied), gives details of preliminary notes of recent work on European corn borer control. Among the insecticides tested, DDT and Ryania spray gave the best control. Among the cultural control practices advocated was the cutting, followed by feeding or burning, of maize stalks after harvest and the ploughing under of the stubble. The Department of Agricultural Engineering reports the construction of an experimental prototype machine for the hot-water treatment of wheat and barley for smut control. The machine is electrically heated and power operated and can be worked by one man. It has an output of 25 bushels per hour.—P.J.B.

1592 NEW YORK STATE Agricultural Experiment Station. Sixty-Eighth Annual Report, 1949. Geneva, 1950, pp. 53.

During 1948, good corn earworm control was obtained by the use of 5 per cent DDT dust applied to the external silks either at 5 and 7 days, or at 4, 6 and 8 days after the date when about 50 per cent of the corn silks became visible. Single applications gave poor control. Results from these dustings warrant the carrying out of field-scale trials with power-operated equipment. Further work will be directed toward reducing the amount of insecticide residue present on the outer husk at harvest. Work is in progress on the mechanism of growth hormone action in plant metabolism and the effect of hormone treatment on the composition of economic plants. The supplanting of Vicland oats by the Bond hybrids (Advance, Clinton and Mohawk) has eliminated major losses due to *Helminthosporium victoriae*. *Fusarium culmorum* has become serious in some cases in reducing the germination capacity of barley seed stocks. Mechanically injured flax seed benefited considerably from seed treatment with Ceresan M and N.I. Ceresan. For the first time recorded, hard seeded soybeans have been grown in New York State; even Tendergreen and Idaho Refugee seed, contained as much as 22 per cent hard seeds.—P.J.B.

1593 CORNELL UNIVERSITY, Agricultural Experiment Station. Sixty-First Annual Report. 1948. Ithaca, 1948, pp. 192.

Investigations of the efficiency of tillage operations and their effect on crop yields are continuing. Results indicate that, under the conditions studied, the elimination of ploughing in the seed-bed preparations for oats following corn did not lead to significant reductions in oat yields. It appears that serious consideration should be given to the elimination of many of the tillage operations now commonly used in seed-bed preparation. Work on the crossing of maize and Central American *Tripsacum dactyloides* is under way; it is hoped to produce crosses that can be used to breed maize with improved adaptation and disease resistance. The Plant Breeding Department reports work on the breeding of wheat, oats and barley for improved yield, quality, winter hardiness, disease resistance and stiff straw. Work on oats resistant to *Helminthosporium victoriae* has led to the production of Mohawk and Advance. Mohawk is as resistant to leaf rust as Vicland and yields satisfactorily. Advance has similar disease resistant properties, but yields more straw per acre than Mohawk. Certain of the new wheat varieties yield better than Yorkwin and Cornell 595 and it is likely that they will be multiplied for commercial distribution. Work on barley has produced one variety combining mildew resistance and satisfactory yield. The Pathology Department reports the following projects under way: investigations of crown rust and root rot of oats, dwarf bunt of wheat, stem rust of cereals and bacterial diseases of beans.—P.J.B.

1594 CORNELL UNIVERSITY. Agricultural Experiment Station. Sixty-second Annual Report. Ithaca, 1949, pp. 215.

INVESTIGATIONS REPORTED:

Basic requirements and design principles for control of insects, diseases and weeds. By C. W. Terry *et al.* p. 109.

Development of equipment for the application of insecticides and fungicides. By W. W. Gunkel and C. W. Terry. pp. 109-10.

Study of certain factors causing inactivation of the photosynthetic mechanism. By D. G. Clark. p. 133.

Anatomical studies on the effect of growth-promoting substances on certain crop plants. By A. J. Eames. p. 133.

Synthetic materials as insecticides. By L. B. Norton and J. E. Dewey. pp. 144-5.

Biology and control of the seed-corn maggot *Hylemyia cilicrura*. By H. H. Schwardt. p. 147.

Study of methods and equipment for applying insecticides to row crops. By J. L. Brann. pp. 149-50.

Breeding wheat, oats and barley for yield, quality, winter hardiness, disease resistance, and stiff straw. By H. H. Love and N. F. Jensen. p. 160.

Breeding corn for silage and grain. By R. G. Wiggans and A. A. Johnson. pp. 161-2.

Diseases of small grains : dwarf bunt of wheat. By L. J. Tyler and H. H. Love. p. 172. See also Abs. 1243.—P.J.B.

1595 MASSACHUSETTS Agricultural Experiment Station. Bull. No. 449. Annual Report for the fiscal year ending June 30th, 1948. Amherst, 1948, pp. 80.

Trials with new oat varieties, have shown that Ajax and Clinton have been outstanding in Massachusetts over a number of years in their lodging resistance and they have ranked high in grain yields. Mohawk was grown for the first time in 1946 and, though not among the highest grain yielders, has proved outstanding for its stiff straw. Work on European corn borer control showed that yields of marketable ears from corn plots sprayed with derris and Ryanex were 42.4 per cent higher than from unsprayed plots.—P.J.B.

1596 MASSACHUSETTS Agricultural Experiment Station. Bull. No. 453. Annual Report for the Fiscal Year ending June 30th, 1949. Amherst, 1949, pp. 86.

The Agronomy Department reports studies of the availability to plants of applied P as influenced by the presence of organic matter and fluorine in the soil. Actively decomposing organic matter in the soil resulted in more effective use of P by plants ; the use of fluorine to replace fixed P in soils was not practicable. In studies on the use of insecticides to control European corn borer, records of damage to maize, made prior to harvesting, showed that of the sprays used, DDT and parathion gave nearly 100 per cent protection ; derris-and Ryanex-treated plots showed moderate stalk breakage ; in untreated plots more than 50 per cent of the plants were infested with borers. Of the dusts used, DDT parathion and Ryanex gave from 92 to 100 per cent control ; untreated plots averaged 2 to 2.4 borers per stem.—P.J.B.

1597 IOWA Agricultural Experiment Station. Report on Agricultural Research for the year ending June 30th, 1948. Parts 1 and 2, Ames, 1948, pp. 390.

Among the 264 active projects listed in Part 1, the following are reported : varietal responses of oats and wheat to cultural practices (projects 145 and 148) ; the development and increase of superior disease-resistant varieties of oats, barley and wheat (Nos. 654, 655 and 656) ; a study of crop production methods for flax (No. 412) ; soybean variety and selection tests (No. 186) ; soybean production in relation to fertilizer applications and crop rotations (No. 782) ; nitrogen fixation by soybeans (No. 789) ; contouring in relation to crop yields and soil and water conservation (No. 786). Part 2 of the report consists of the 13th Annual Report of the Iowa Corn Research Institute. The report is sub-divided into ten subsections under which forty-three active projects are listed, among which the following are noted : rotation and fertilizer studies with corn, soybeans, oats, hay and green-manure crops on Clarion and Webster soils at Ames (No. 840) ; a study of different varieties and strains in different parts of Iowa (No. 161) ; the interaction of water, growth hormones and food supplies on the development of maize (No. 678) ; and a study of the factors influencing the resistance of strains of corn to *Ustilago zeae*.—P.J.B.

1598 OREGON Agricultural Experiment Station. Bull. 477. Oregon's Agricultural Progress through Research. Annual Report. Corvallis, 1950, pp. 140.

Bonneville, a new high-yielding, late-maturing spring barley with stiff straw, has been released following several years' tests. In trials for earworm control, plots sprayed with 5 per cent DDT yielded 97 per cent clean ears, compared with 20 per cent from unsprayed plots. The operation, performance and economy of a small portable dehydrator for drying ear corn in the crib have been tested. Drying temperatures of 150°F. did not lower the feeding value of the corn ; the carotene content of the artificially dried corn was 3.46 ppm., compared with 3.07 ppm. for air-dried corn. The trials showed that ear corn with a high moisture content could be safely stored through the winter following artificial drying to a 20 per cent moisture content. Varietal trials to produce a high quality fibre flax with disease resistance have been continued and promising strains have been isolated.—P.J.B.

1599 MONTANA Agricultural Experiment Station. Bull. 457. **Montana insect pests 1947 and 1948. Thirty-second report of the State Entomologist.** By *J. H. Pepper, O. B. Hitchcock, C. R. Hunt* and *R. Schmiedeskamp*. 1949, pp. 28.

1600 GEORGIA EXPERIMENT STATION. Sixtieth Annual Report. 1948, pp. 135.

The tests of white hybrid corn varieties to find a hybrid suitable for Georgian conditions have given promising results. Figures are given. Work on cotton has included the testing of a number of wilt-resistant selfed lines of Empire. A table gives comparative data of the percentage wilted plants, lint percentage, acre yield and acre value of fourteen selfed lines of Empire, Coker 100 Wilt (wilt-resistant) and Deltapine (wilt-susceptible). Empire has proved well adapted to a wide variety of conditions and yields of lint averaged 35 to 45 lb. more per acre than Coker 100 Wilt, Stoneville 2B and Deltapine. In cotton-seed treatment trials with three seed treatments, Ceresan M at a rate of 1.5 oz. per bushel of seed, gave the highest seedling emergence percentages with fuzzy and acid delinted seed; Seedox at 1 oz. per bushel of seed gave the best results with reginned seed. Trials to determine the effect on maize yields of spacing and three rates of nitrogen application, showed that the denser corn stand (8150 stalks per acre) yielded only 2 bushels per acre more than the thinner stand (5600 stalks per acre), whilst increases in nitrogen applications from 32 to 128 lb. per acre, gave yield increases of almost 5 bushels per acre. A new variety of wheat, Chancellor, leaf-rust resistant and with a good yield and milling quality, has become available for distribution. Oat, barley, rye and soybean trials are briefly summarized. The Gatan variety of soybean is becoming popular as a cover crop for Louisiana sugar cane fields.—P.J.B.

1601 NEW ZEALAND. Annual Report, Department of Agriculture, 1949-50. Wellington, 1950. pp. 128. [See also *Herb. Abstr.* 17, Abs. 577 and 19, Abs. 672]

INVESTIGATIONS REPORTED:

MANURIAL TRIALS ON WHEAT:

Nitrogenous top-dressings gave significant increases in yield in many cases. Phosphorus gave increases only on poorer land. Potash gave no response. (p. 20).

OAT BREEDING:

The primary aim is a high quality milling oat of good yielding ability and resistance to lodging. The testing of new oat varieties from overseas against standard local varieties continues. (p. 20).

INTRODUCTION OF BARLEY VARIETIES:

Standard New Zealand varieties are losing ground to imported varieties. The Danish variety Kenia and the Australian Research are most promising, though the latter is not favoured by the maltsters. (p. 20).

FIELD TRIALS ON RUST-RESISTANT VARIETIES OF INTRODUCED RUSSIAN FLAX (p. 20).

MAIZE HYBRIDS:

The United States hybrid Pfister 360 is replacing local varieties, but trials have shown that even higher yielding hybrids are obtainable. (p. 21).

IRRIGATION AND YIELDS:

Wheat, swedes, chou moellier, rape, and mangels are being investigated. (p. 26).

HORMONE WEED-KILLERS FOR CONTROLLING WOODY PLANTS:

2,4,5-trichlorophenoxyacetic acid is showing much promise in the control of woody plants such as blackberry and gorse. Many other trials with hormone weed-killers are in progress and their effect on numerous weeds and crops are being determined (p. 22).—C.W.S.H.

1602 AUSTRALIA. Commonwealth Scientific and Industrial Research Organization, Division of Plant Industry. Div. Rep. No. 5. Plant introduction notes No. 1. 1949, pp. 45. [Mimeographed]

" This publication is intended to be the first of an annual series designed to supply information about some of the more promising or otherwise interesting plants introduced and tested by the Plant Introduction Section of the Division of Plant Industry. The notes are supplied primarily for the information of agricultural scientists and others who are concerned with testing new species and varieties in Australia. They should be regarded as recommendations for further trial in suitable regions and it must be emphasized that the information supplied deals usually only with preliminary experiments."

Articles included in this publication are:

Barley trials in Western Australia. By E. T. Bailey.
Trials of bulrush millets in Northern Australia. By J. F. Miles and S. G. Gray.
Vetches and related species for grain, green manure and pasture. By E. T. Bailey, and C. A. Neal-Smith.
Tedera (*Psoralea bituminosa*) in Western Australia. By E. T. Bailey.
Pasture trials of brome grasses. By C. A. Neal-Smith and E. T. Bailey.
Erect strains of cowpea for hay and green manure. By J. F. Miles, C. A. Neal-Smith and S. G. Gray.
Soybean investigations in eastern and northern Australia. By S. G. Gray, J. T. Miles, and C. A. Neal-Smith.
Variety trials of linseed in southern Queensland. By S. G. Gray.
New dwarf, and hybrid sunflowers. By S. G. Gray, and J. F. Miles.
Promising Indian varieties of rapeseed. By J. F. Miles.
Trials of Guar: A source of mucilage for paper manufacture. By S. G. Gray, J. F. Miles, and C. A. Neal-Smith.—K.O.

1603 WEST AUSTRALIA. Report of the Institute of Agriculture 1938-48. Nedlands. pp. viii + 69.

INVESTIGATIONS REPORTED :

THE BIOLOGICAL VALUE OF PROTEIN IN *Lupinus pilosus*. (pp. 32-33). See *Herb. Abstr.* 18. Abs. 150.

CHEMICAL COMPOSITION OF WHEAT (pp. 39-41).

FACTORS INFLUENCING THIAMIN AND RIBOFLAVIN CONTENT OF WHEAT.

See *Fld Crop Abstr.* 2. Abs. 1177. Results indicate that the riboflavin content of wheat is unaffected by the rotation in which the crop is grown (p. 41).—K.O.

1604 ARGENTINA, Ministerio de Agricultura y Ganaderia. Memoria de la segunda reunion de lino, 31 de Mayo y 1 Junio de 1949. [Memoir of the second flax conference held on May 31st and June 1st, 1949]. 28 × 22. pp. 157. Pergamino. 1949. [Mimeographed]
See also abstract numbers, 1189, 1216, 1249, 1278, 1279, 1390.—N.G.S.

1605 SARAWAK Department of Agriculture. Annual Report for 1948. 1949, pp. 65, with map, bibl. 19.
Padi cultivation is being developed. Two appendices (12 and 13) give an appreciation of the present situation regarding swamp/wet, and hill/dry systems of cultivations. A preliminary economic study of those two systems is given in appendix 14 the figures quoted being based on estimates arrived at through discussions with farmers. At the Rantan Panjang Padi Station, selection and variety trials are proceeding satisfactorily. Trials there have indicated that off-season cropping with other crops increases the yield of the succeeding padi crop. Chapter 12, pp. 28-29, reports the results of Mechanical Cultivation experiments with the Howard Rotary Hoe, the Autoscythe and the Iron Horse. The first two proved useful, the third required modification.—N.G.S.

1606 BRITISH GUIANA. Annual Report (Divisional) of the Department of Agriculture for the year 1947. Georgetown, pp. 28. [Received 1950]
Results are given for a number of rice variety trials. A new variety, D.52-37, was successfully introduced into commercial cultivation. Two superior hybrid strains, D.54-42, and D.95-42, exceeded the standard, D.110, by over 10 per cent over four crops. The optimum application of pen manure was shown to lie between 9 and 12 tons per acre. Ploughing experiments showed that on new land it is better practice, and more economical, to plough once for each of the first four crops. Thereafter, it is better to plough twice per crop as on old land.—N.G.S.

NEWS ITEMS AND SCIENTIFIC NOTES

Great Britain

1607 EXPERIMENTAL FARMS. On 15 Nov., 1950, the House of Commons debated the position of agricultural experimental farms. The Joint Parliamentary Secretary to the Ministry of Agriculture (Mr. George Brown), in replying, expressed the intention of H.M. Government to set up some seventeen or eighteen experimental farms at which new methods of research can be tested on a field scale under controlled conditions. So far seven such farms have already been established; one at Martyr Worthy, Hampshire; one near Cambridge; one in Nottinghamshire; one in Lincolnshire; one at Kings Lynn, Norfolk; one in Hereford; and one at Malton, Yorkshire. Farms are being set up in East Lancashire, Cardiganshire, and Caernarvonshire. The management of each farm is to be in the hands of a director, an officer of the National Agricultural Advisory Service.—*Hansard* Nov., 1950.—N.G.S.

1608 AERIAL DUSTING FROM FIXED WING AIRCRAFT. A demonstration of this was given recently in Britain using a special modified Tiger Moth aeroplane flown from an operational height of 8 ft., over a 30 ft. wide strip of land Dust was fed from a hopper in the forward cockpit into a 48 in. " sprayer " mounted just forward of, and below, the trailing edge of the lower wing. Dust was applied at a rate of 30 lb. per acre and fertilizer at 2 cwt. per acre. A new, very fine, free-flowing dust suitable for mixing with insecticides and fungicides was used. This dust retains its properties under severe changes of humidity and temperature in storage. This filler, incorporated with BHC, DDT and sulphur, is being used to control the cotton leaf worm in Egypt. *World Crops* September, 1950.—E.B.H.

1609 OXFORD UNIVERSITY. Writing in *Agriculture*, Professor Blackman describes some aspects of the Department of Agriculture. An outline is given of some of the investigations with which it is concerned. These include the development of selective herbicides, the development of oilseed crops, the factors underlying the falling productivity of the field bean and the use of radioactive isotopes in the study of plant nutrition. A description is given of the work of the Institute for Research in Agricultural Economics. *J. Minist. Agric.* July, 1950.—N.G.S.

Germany

1610 A NEW OIL PLANT. Two or three years ago investigations were begun in Germany to ascertain the possibilities of utilizing *Xanthium* species as oil plants. Breeding work is proceeding and two varieties have been produced one of which gave 39 per cent and the other 42 per cent oil, their protein contents being 47 and 36 per cent respectively. *Tidskrift för Lantmän* June-July, 1950.—R.P.J.

Sweden

1611 OLEIFEROUS CROPS. With an area of more than 160,000 ha. under oil crops, Sweden now takes first place in Europe. In France, the area under these crops is 80,000 ha., and in Germany 45,000 ha. *Lantm. Svensk Land* July, 1950.—R.P.J.

U.S.S.R.

1612 AGRICULTURAL SCHOOLS. To give young workers on collective farms a better theoretical knowledge of crop- and animal-husbandry, one-year agricultural schools were established in 1944 in all provinces and republics of the Union. In 1947-48, 58 more schools were founded, the total number now being 560, of which 340 are located in the Russian republic. In the course of 5 years over 200,000 young farmers have received instruction in these schools; the number of pupils in 1949 being about 45,500 while this year it is larger. *Landbrugsraadets Meddelelser* 13 July, 1950.—R.P.J.

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